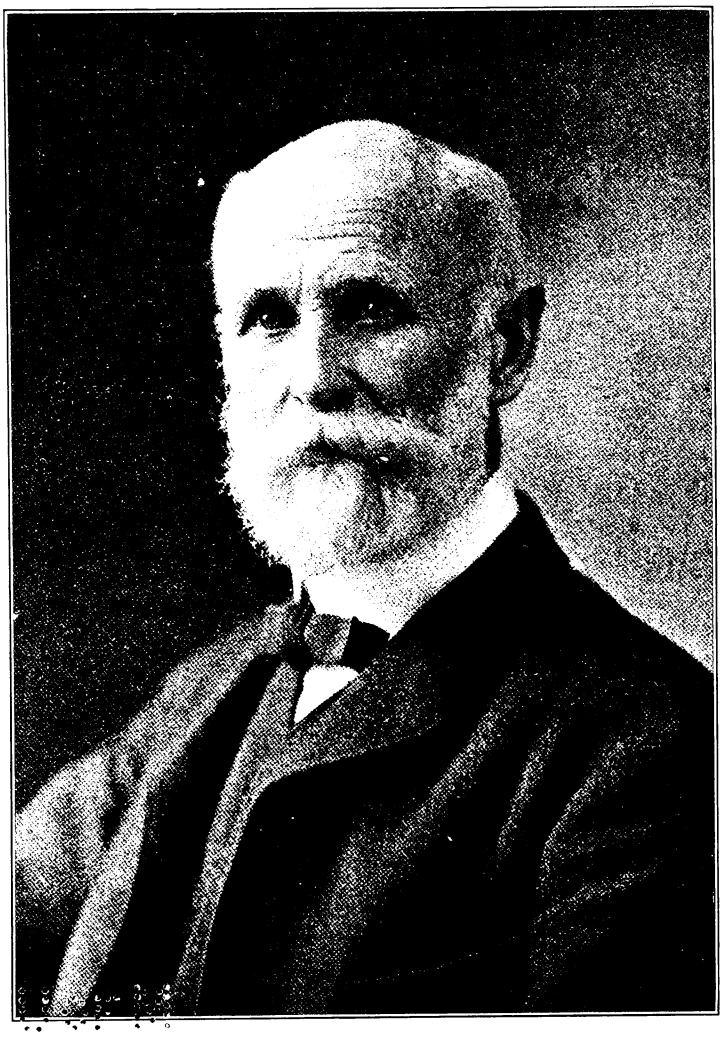
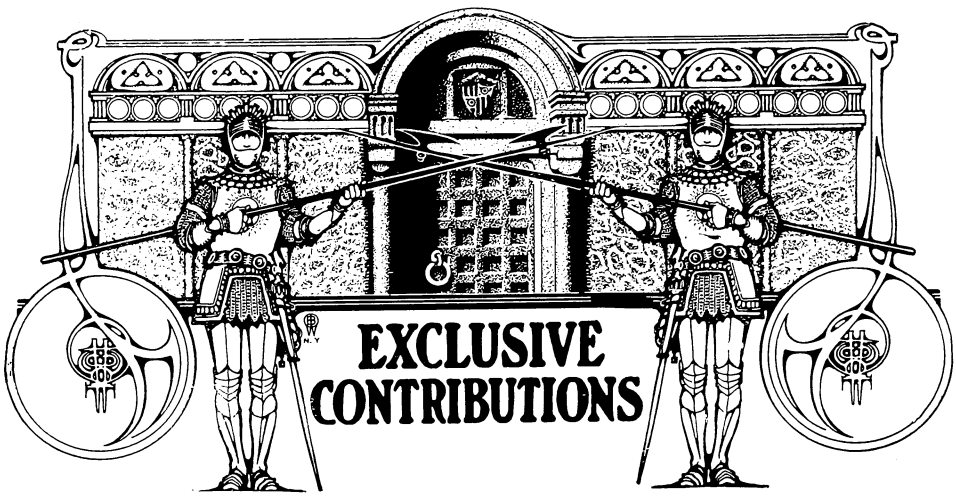


G. V. Black

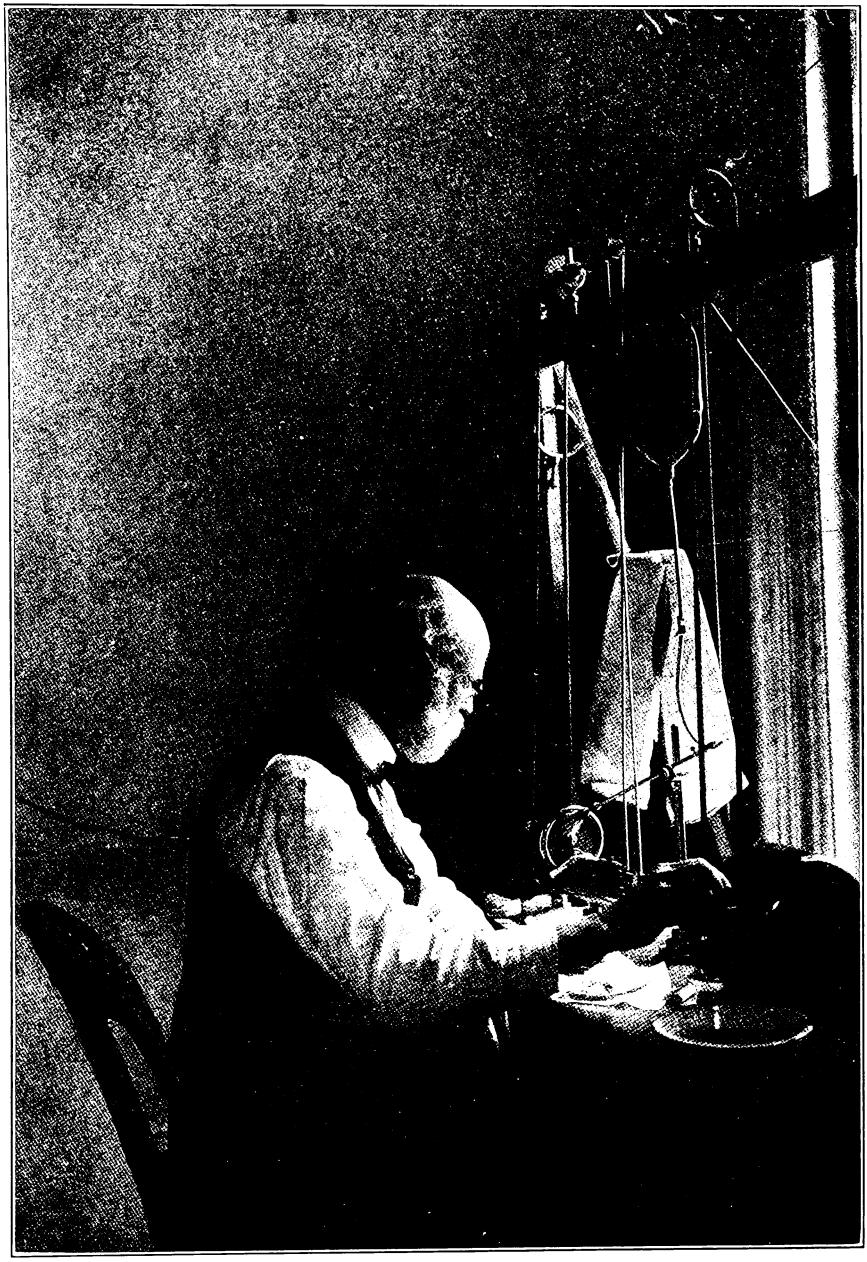


Greene Vardiman Black, Dentistry's Greatest Living Scientist.

By Chas. E. Bentley, D.D.S., Chicago, Ill.

Greene Vardiman Black, D.D.S., Missouri Dental College; M.D., Chicago Medical College; Sc.D., Illinois College; LL.D., Northwestern University. This imposing array of honorary degrees would seem in itself to suggest a pretty full life history; but the real value of a life such as Dr. Black's to his fellowman is not so much the knowledge of its honors and public triumphs, as is the narrative of the days and nights of persistent labor, the steady, unflinching blows, hour after hour, which forged the chain of highest scientific ability upon which these honors are hung.

On a quiet little farm in Illinois, as early as 1836, Dr. Black first saw the light of this world into whose secrets he has since so successfully inquired. In the busy, hard life of a small Western farm even childhood finds small place for idling, and while yet very small the boy helped his father considerably in the farmwork. He was always, however, a better rifle-shot than a plowboy, and doubtless the many hours, during those early years, spent in the forest tracking game, gave him that intense love for and intimacy with nature which so influenced his after inclinations in life. Dr. Black has never lost his taste for hunting, and in his store of reminiscences are many stories of the chase which have all the interest of those pioneer days when our forests were yet young.



PROF. BLACK AT WORK (PHOTO BY DR. NOYES).

Dr. Black's School Days.

If genius is, as it has been defined, "the capacity for hard work," then that little lad on the Western farm, who has come to be a leading authority in his chosen profession of dentistry in this country, is an American genius of the first rank. Of the schooling which comes from text-books, Dr. Black may be said to have received none. His school life consisted entirely of a few terms, of a few months each, in the country school near his home; but his mental attitude, even as a child, was always of that inquiring thoughtful kind which made out its own peculiar road to the attainment of knowledge.

There are some rare personalities whose highest development seem due to the fact that there were no external props to assist their growth; whose perfect flowering has been the result of a natural and unrestricted evolution from within, out. This seems to have been Dr. Black's class. When he was but seventeen years of age he began the study of medicine, and pursued this work with characteristic ardor and thoroughness for three years. Meanwhile he developed a decided skill in mechanics, a trait probably inherited from his father, who, in a crude way, was of quite a scientific turn. His love for mechanical work probably influenced the young student toward dentistry, which he took up after his medical study.

How a man studied dentistry in the early part of the century would make a chapter of interest not only to the dental student, but to all who are interested in the progress of the applied sciences. In those days there were no classes in bacteriology, pathology, materia medica and the other divisions of inquiry which round out and complete the efficiency of the caretakers of the teeth of the present day. One paid a practicing dentist a stipulated sum, and he permitted you to work in his office for one year. The work consisted principally in pulling teeth. Young Black served this sort of novitiate, but the after history of American dentistry shows that he at least did not confine his study to extraction alone. Indeed, Dr. Black's professional life is, in a way, a history of American dentistry. Starting in those first crude days, when the skill and science of dentistry were yet undreamed of, he was one of the potent factors which first started the profession on its upward line of progress. And now that he has become the Nestor in the profession, there is no one among the younger men who has a stronger grasp and insight into the most advanced work of modern dentistry.

Early Days of Practice.

At twenty-one Dr. Black married and settled down to the practice of dentistry in Winchester, Ill. This was in 1857, and when, a few years later, war broke out, he left his forceps and shouldered

PROF. BLACK'S WORKTABLE.

a gun as a volunteer soldier. After a brief service he was taken sick, and after spending several months in a hospital in Louisville, was discharged for disability and returned to Jacksonville, Ill., where he resumed the practice of his profession in 1864. Much of Dr. Black's student life is identified with Jacksonville.

He was one of the early attendants of the Literary Union of that place, a society which has met on Monday evenings for nearly forty years without a single omission. He has presented before this association some of his best and most thoughtful papers.

Contributions to Dental Literature.

Dr. Black is widely known both at home and abroad by his scientific books and papers. The first article of his which attracted attention was published in 1869 in the *Missouri Dental Journal.* Previous to the publishing of this paper the welding together of two pieces of gold was always the work of chance. Sometimes they would weld perfectly, at other times not at all, causing much inconvenience to the dentist. Dr. Black discovered by chemical experiments that certain gases gathered on the surface of the gold and prevented cohesion. By subjecting the gold to fire he drove off these gases and found that cohesion was always inevitable. This discovery was of incalculable value to the profession, and the claims of the paper have never been refuted.

This work was soon followed by a series of articles for the *American System of Dentistry,* under the following heads: "General Pathology," "Dental Caries and Its Treatment," "Diseases of Peridental Membrane," and "Abrasion and Erosion of the Teeth." Of these papers "Diseases of the Peridental Membrane" is most important, because its appearance first drew special attention to the pathology of this membrane. Prominent men all over the world began to study the subject and to publish the results of their inquiry, and what we know of it to-day is largely due to the impetus given by Dr. Black.

In 1891 Dr. Black published in the *Dental Cosmos* a series of papers on "The Management of Enamel Margins"; later the same journal for five months contained an epoch-making series of articles from his pen, entitled "Extension for Prevention." The method of excavating cavities in the teeth had never been systematized. Recognizing the supreme importance of preserving the health of the interproximal gum tissue and tooth surface Dr. Black recommended the extension of the cavity margins and the building out of proper contact, so that the space between the teeth would be kept clear and healthy, and the recurrence of decay at its most vulnerable points prevented.

In 1893 he published a paper, "Anchorage of Proximate Fillings in the Bicuspids and Molars," a paper of great importance because of

FRONT VIEW OF FARMHOUSE WHERE PROF. BLACK SPENT HIS BOYHOOD. PROF. BLACK NOW OWNS THIS FARM OF 200 ACRES, FIFTEEN MILES FROM JACKSONVILLE, ILL., HAVING PURCHASED IT FROM HIS FATHER'S ESTATE.

SOUTH VIEW OF FARMHOUSE.

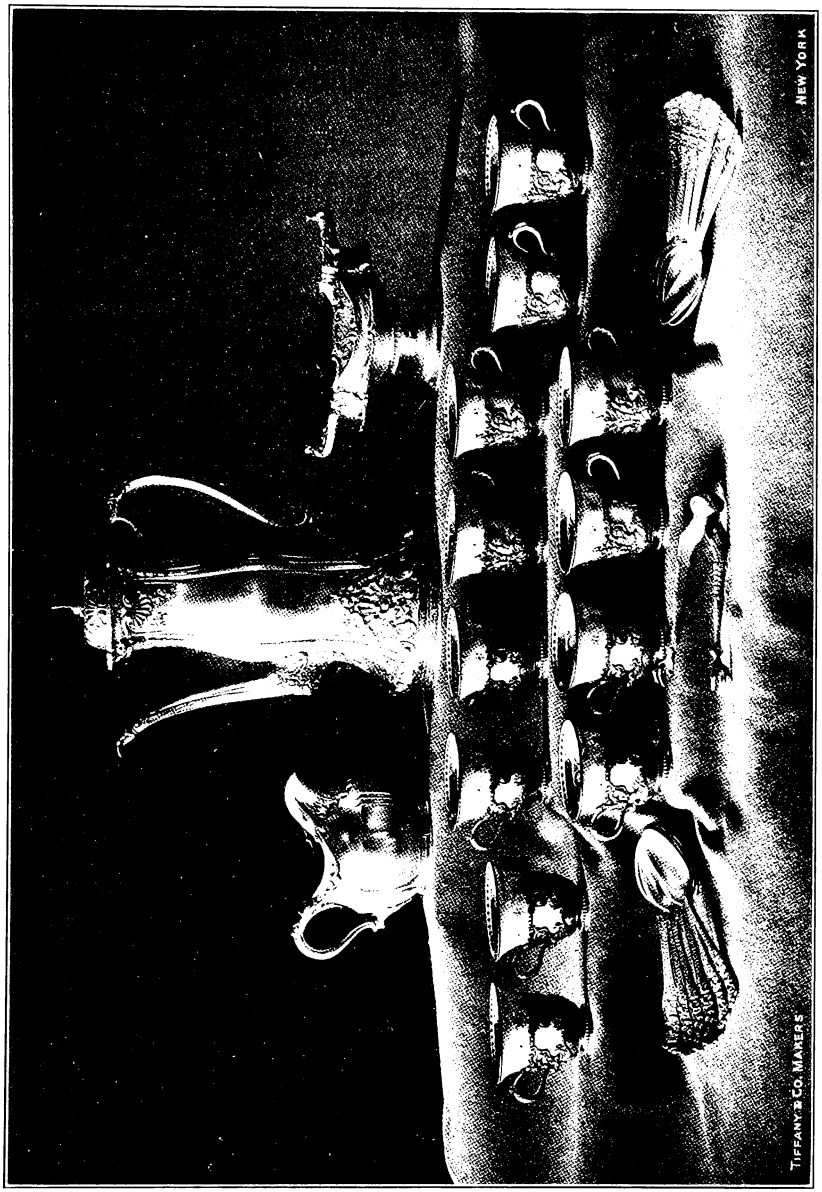
its suggestiveness. The accurate measurement of the force used in mastication and the resistance of filing material to the stress of mastication had never before been called to the attention of the profession. This paper was a forerunner of what followed two years later, the invention of the phago-dynamometer, an instrument which records accurately the crushing point of all edibles, and a dynamometer for the measurement of the stress of metals.

Another instrument of equal value invented by Dr. Black was the amalgam-micrometer, a machine which measures the expansion or contraction of metals to the 1-10,000 part of an inch. No instrument-maker could be found who could intelligently put Dr. Black's idea into shape. He knew that iron manufacturers had an instrument which measured the tensile strength of metals used in building, and it was the principle of his machine that he used, and with his own hands he formed one of the most delicate of scientific instruments.

An interesting series appeared in the *Dental Cosmos* in 1895 on the following subjects: "The Physical Properties of Teeth in Relation to Caries," "The Force Exerted in the Closure of the Jaws," accompanied by the phago-dynamometer, an instrument for measuring the stress necessary for the mastication of foods; "Filling Materials—Showing the Expansion, Contraction and Composition of Amalgams in Use," and "The Examinations of Gold."

Dr. Black published in 1884 a book on "Formations of Poisons by Micro-organisms." This was one of the first books given to the world concerning poisons which emanate from micro-organisms, and in the writer's opinion is one of the most important ever written on bacteriology, in that it was the first to give the chemistry of the poisonous products of micro-organisms. Pasteur's fame rests upon the fact that he discovered the parasites which fed upon the grape and the silkworm, and taught the farmer and the silk-worker how to distinguish the healthy grape and the healthy worm from those which were diseased. These two discoveries and that of the poison of rabies are his principal contributions to science. Koch discovered the bacillus of tuberculosis, and gave to the world the method of staining and preparation, so that any microscopist could follow out his investigations. During the time that these men were carrying on these lines of inquiry, Black had made his important investigation into the chemical nature of the poisons of micro-organisms.

In 1887 another book, "A Study of the Periosteum and Peridental Membrane," came from this busy worker. The historical importance of this work rests in the fact that Dr. Black's opinions concerning the peridental membrane raised a widespread controversy. The controverted sayings are now generally accepted.



GOLD COFFEE SERVICE PRESENTED TO PROF. BLACK BY THE SECOND DISTRICT DENTAL SOCIETY OF NEW YORK AND ONE HUNDRED PROFESSIONAL FRIENDS IN THE EAST.

Black's "Dental Anatomy" was published in 1890, and four editions of it have been entirely exhausted. It is used in every recognized dental school in the country.

Possibly the greatest literary creation of Dr. Black is in his latest book of "Operative Dentistry," which is published in two volumes, the first being the treatise on "The Pathology of the Hard Tissues of the Teeth"; the second, "The Technical Procedures in Filling Teeth." These volumes are profusely illustrated and each detail is amplified. Without doubt this is the latest and possibly the most complete word that has ever been spoken with reference to this subject, and will for all time stand as a classic with reference to operative dentistry. It is a book that every practitioner and every dental student should have in his scientific collection.

Prof. Black As a Teacher.

As a lecturer and teacher Dr. Black has been remarkably successful. His lectures have been delivered in cities throughout the country, while several Western towns know him as a teacher. In the '70s he taught in the Missouri Dental College; in '83 in the Chicago Dental Infirmary; in '85 in the Chicago College of Dental Surgery; in '90 in the Iowa Dental School; in '91 he came to the Northwestern University Dental School, where he has taught ever since.

One of the greatest aids which Dr. Black has given to the profession of dentistry, and the one probably most far-reaching in its effect, was the introduction of technic work in the schools. This technic work is simply the object lessons of modern pedagogy applied to the freshmen in the dental schools. The young student handles the tooth himself, cuts it in two, and studies it inside and outside. He makes cavities in it with his hands and fills them according to Dr. Black's directions. This course of training gives an increased knowledge of the outer and inner anatomy of the tooth, and cultivates a delicacy of manipulation which otherwise would only be acquired from many years of dental practice. Technic work was first introduced by him in the Chicago College of Dental Surgery, and to-day almost all of the dental colleges in the United States have adopted this natural method of teaching.

In 1893 Dr. Black was appointed chairman of the Committee on Dental Nomenclature of the World's Columbian Dental Congress, which met in Chicago. For one entire year he searched the libraries of Eastern and Western cities, and reviewed the nomenclature of dentistry from the very dawn of the science. At the congress he submitted this valuable report with suggestions of his own. This revised nomenclature is being gradually adopted as the only correct nomenclature of the profession.

Dr. Black's visit to Colorado during the summer of 1909 is a good

example of his interest in the progress of science and his method of doing things. Reports had come to him from time to time regarding peculiar defects in the enamel of the teeth of children raised in and near Colorado Springs. He secured some of the teeth for examination and soon afterward determined to visit the region, which he did, spending a month in studying this really wonderful condition from all angles. He examined the teeth of hundreds of children; went over the analyses of soils, water, food, etc., with chemists; lectured on the subjects before the Board of Trade and Business Men's Association; obtained the views of many dental and medical men, and finally laid out plans to be followed in solving this peculiar problem which is of such vital interest to the people of that district. Since his return Dr. Black has kept in close touch with the progress of their work.

Studies in Other Fields.

Broad and deep as has been Dr. Black's work in his chosen profession, his thirst to know and to do has not been confined entirely to dentistry. What may be called his mental avocations are important enough and have been treated with sufficient thoroughness to be the special life work of any other man. He has mastered several languages, and reads much in the French and German journals, to which he is a subscriber. His studies in meteorology have been so complete that his understanding of winds and storms is as thorough as that of Old Probs himself. Before the Jacksonville society, mentioned above, Dr. Black read a paper on a "Study of Winds and Storms," which was the result of a review of the entire literature of the subject. He has made an extended microscopical investigation into the woods, cereals and earthworms, the results of which are not yet published. An elaborate study of various kinds of molds, with their spores, has also been the work of this indefatigable student. In his library are 5,000 microscopic slides, made and beautifully classified by his hands.

When asked recently how he managed to accomplish so much in such a thorough manner, Dr. Black answered in his quiet way: "When I first began to practice, at twenty-one, I formed the habit of going to my office early in the morning and putting in an hour of study each day. I have kept this up for many years, and you do not know how much such systematic work will accomplish until you try the plan. When I take up a subject I try to exhaust it thoroughly before I go on to the next."

With all this list of attainments, Dr. Black bears his seventy-three years of ripe scholarship with a simplicity and modesty which prove his chief attraction to those who know him. His home life is one of great charm. In their pretty home the doctor delights to introduce the appreciative visitor to his well-stocked library, with its slides and pictures

and casts. There he will talk by the hour—not of himself, for to get him to do this is next to impossible, but of the work, of new ideas, new channels of inquiry, for the active mind which has already thrown off so much of use and beauty is undimmed in its eagerness and acuteness, and much more may yet be added to the already long list of its accomplished things.

Principles of Rational Therapeutics in the Treatment of Gangrenous Pulp.*

By Jules A. Vuilleumier, D.D.S.,
Assistant at the Histological Laboratory of the New York College of Dentistry.

The constant change in the methods and medicaments used in the treatment of putrescent pulps proves that our present attainments are neither rational nor satisfactory. It is due to the fact that we are still lacking scientifically established bases for treating gangrenous pulps. Though a great many methods are built on various hypotheses from a chemical and clinical point of view, it is a question whether the results figured out on paper do really take place within the tooth.

When there were not sufficient theoretical facts at hand, practical were resorted to. The fact that a cotton treatment with a disinfectant sealed in the root canal remained odorless, and that on percussion the tooth was not painful, was taken as sufficient proof of the sterile condition of those canals. The disposing of gases such as H_2S and NH_3 liberated during the gangrene of the pulp and the neutralization of the end products of albuminous decomposition are brought to the foreground. They are looked upon as the principal factors in the treatment and such agents are pronounced as most efficient that quickly bring about the above stated condition, *i. e.*, absence both of odor and reaction to percussion. *On the contrary, the inhibition of bacterial infection is paramount.*

Teeth sealed hermetically and without clinical symptoms do not of necessity have sterile root canals. The practitioner meets almost every day with cases where a sudden periostitis sets in, though he knows that the root canal was carefully treated. That the absence of odor of the

*This article is a report on Dr. B. Mayrhofer's interesting investigations. The work itself is too extensive for reprint in a dental journal, but I have tried to bring out the principal points, omitting a number of tables recording the results of cases under test.—J. A. V.

fiber treatment be a proof of the sterile condition of the canal is incorrect. Fetid odor accompanies decomposition. Pus, however, is caused by *streptococci* and *staphylococci,* and their cultures and products of metabolism are inodorous. To inhibit further decomposition is all we can look for in such cases.

To obtain positive results we must investigate the conditions within the root canal, and see by what agents and methods we can obtain a complete sterilization.

Tricresol and Formalin Treatment.

Mayrhofer says: "I have made use in my investigations of the tricresol-formalin mixture, as advised by Buckley, because we obtain with it apparent relief at the first sitting.

"I have investigated to this present day 179 cases, on which I made 1405 tests; 800 on canal contents; 400 on cotton fiber treatments placed in the canals; 100 on cotton pellets placed into the pulp chamber, over the canal contents.

"The rest on pus from fistulas, etc."

It has long been customary to fill a tooth permanently only after it has been temporarily closed for a short or longer period of probation, and when the fistulas closed up and the aforestated tests for sterility were present, the fillings were finished.

"I tested these methods," says Mayrhofer, "in the various cases of infection, from an incipient periostitis to an alveolar fistula. Treatments of tricresol and formalin were placed in the root canals, then removed and examined bacteriologically. The results were as follows:

"Cotton fiber treatments left in canals from which only part of the contents were removed were found to be sterile for twenty-four hours, and in some cases for a longer period. If afterwards some of the detritus of the same canal was removed and investigated, micro-organisms were found to be present, and cultures of *streptococci, staphylococci* and *bacilli* could be obtained. After the second twenty-four hours the fiber treatment, which was sterile at the first test, was found to be reinfected.

"If dental canals were emptied and cleaned out with Tricresol and Formalin and a treatment of the same was sealed in, they remained sterile for from twenty-four to sixty hours. The same treatment found sterile at the first test, when again left in the canal from seven to ten days, and more showed reinfection."

These were the results obtained invariably, though fistulas had healed up, and the fetid odor and soreness had disappeared. Cultures could even be raised from such fiber treatments, on which the odor of the sterilizing agent was perceptible. Most teeth were under observation from several months to a year, and it was seen that micro-organisms were present

within their root canals without the reappearance of clinical symptoms. *Here are proofs that the clinical symptoms are entirely independent of the bacteriological, and it is incorrect to assume that teeth which do not react to percussion and in which the fiber treatment does not show a bad odor are sterile.*

Micro-Organisms in Root Canals

Before we consider the results of our bacteriological investigations, we must explain what we mean by infection and how we are going to deduce the former in our finel conclusions. We have to distinguish on one side between infections within the pulp canal proper and infection within the canaliculi of the cementum and dentinal tubuli, and, on the other hand, infection beyond the apical foramen.

The former is met with in putrescent pulps, or in canals where the filling has lost its asepsis and where no aseptic agent was used.

Secondly, in cases where germs have not been removed on evacuation of the canal contents and have escaped the action of the antiseptic.

It should be mentioned that not every disinfecting agent acts as a sterilizer. In order to destroy the micro-organism, and principally the *streptococci,* the drug used must come into immediate contact with them. When we consider the difficulties encountered when inserting cotton fiber treatments into some canals down to the apex, and when we realize the many recesses such a canal may have where the micro-organism can not be reached, we will understand that the task of sterilizing the pulp canal thoroughly is not easy. Again, our medicament is very volatile, and we will find that the same has a chance to evaporate within a few hours. This seems to explain why we obtained sterile fiber treatments and infected canal contents in one and the same canal. Concerning the infection of the canaliculi of the cementum and dentinal tubuli, it has long been known that the *streptococci* grow into the same (Miller and Von Mettnitz). Some authors assumed that the micro-organisms travel centrifugally through the canaliculi to the pericementum, and, as a result, cause secondary infection. Miller opposed this theory. He claims he has never found any bacteria in the canaliculi near the periphery of the root.

Mayrhofer agrees with Miller in this respect, but, nevertheless, considers the micro-organisms within these canaliculi of great importance in the final treatment of the canals.

Some practitioners have discarded medicaments that coagulate albumen in order to allow such disinfecting agents to penetrate to the germs within the canaliculi of the cementum, based on our law of osmosis. It is still a question of doubt whether those antiseptics reach them at all. Consequently, it is injudicious to rely too much on the penetrating power of this or that medicinal agent.

Finally, infection beyond the apical foramen is not only found in complicated cases, but also in simple ones. As a rule, the former arises from the latter. Here nature offers a great obstacle, forming granulation tissue which acts as a filter to bacteria. Mayrhofer's investigations showed:

Streptococci,	about	96%	in all tests
Staphylococci	"	18%	" " "
Bacilli,	"	37.5%	" " "

and a few yeast cells.

In every stage of infection the *streptococci* seemed to predominate. Sometimes we find them as pure cultures, then again in company of *staphylococci* and *bacilli.*

We found them in badly infected teeth, and in teeth with no odor to the canals. On the other hand, specimens are on record where we had fetid odor and no presence of *streptococci* nor *bacilli.*

Since the *streptococci* predominate, it would be interesting to know whether they are crowded out by other micro-organisms in mixed cultures, quantitatively and qualitatively.

They offer unusual resistance to disinfectants. In most cases we find that under treatment the other bacteria disappear first. As a result of these properties of the micro-organism, and particularly of the streptococci, it is difficult to obtain permanently sterile root canals, and we have to look to our filling material for successful treatment of gangrenous teeth.

The Theory of Reinfection.

It was seen on tests made with fiber treatments and canal contents saturated with Tricresol Formalin, that we obtain sterile conditions within the first twenty-four hours; after this most cases showed the reappearance of micro-organisms, principally *streptococci, staphylococci,* and *bacilli.*

The question is, how do these germs get there?

The instruments used in the treatment had been sterilized, and the filling material used to seal in the treatment was examined and found germ proof. The only place for them to exist are in the canaliculi of the cementum and in the dentinal tubuli. These are from 1.3 to 2.2 microns in diameter, according to Kolliker. Towards the apex of the root they measure about 4.5 microns, and may be enlarged by the pathological action of the micro-organism. The *streptococci* are less than one micron in diameter. The *staphylococci* from 0.7 to 0.9 microns, and so are the bacilli in their transverse diameter. By their peculiar method of growing, the *streptococci* and some *bacilli* enter the canaliculi. They escape the action of the disinfecting drug, and after the latter has lost its strength

and disinfecting power they grow back into the canal. A leaky, non-aseptic canal filling and favorable conditions allow them to grow cultures, setting up ultimately a periostitis and alveolar abscess, for which we have been unable to account heretofore.

This method of growing back into the canal by the micro-organism was seen repeatedly in all cases where we first obtained sterile conditions after twenty-four to forty-eight hours, followed by reinfection, if left in the canals longer. Hence, it seems unreasonable to put a tooth under probation of a root-canal filling, because you may be certain that the root-canal will be reinfected when you are ready to fill permanently.

Change the treatment of tricresol and formalin often and fill the root permanently at a judicious time.

Various methods have been recommended since using the tricresol-formalin mixture. Some go as far as not to evacuate the canal contents, merely the pulp chamber, filling the same with a zinc oxide paste and tricresol and formalin, which is to sterilize the decomposed matter in the former. Buckley himself advises to place a pellet of cotton saturated with tricresol and formalin over the canal openings in order to counteract the action of the end products of albuminous decomposition.

He says: "Ammonia and hydrogen sulphid are the main gases formed. To dispose of these gases we seal hermetically into the tooth a cotton pellet saturated with tricresol and formalin. The formalin will unite with ammonia, producing urotropin, a solid, as $6CH_2O+4NH_3=(CH_2)_6N_4+6H_2O$.

Formalin also unites with hydrogen sulphid, forming methyl alcohol, a liquid, and sulphur, a solid, as $2CH_2O+2H_2S=2CH_3OH+S_2$.

Whether this chemical union really takes place in the tooth needs more elucidation. From a bacteriological point of view this hypothesis is a complete failure. Every case tested according to this rule showed the presence of micro-organism in the canal contents; the only sterile conditions obtained was where the fluid came in immediate contact with the decomposed pulp.

From a clinical point of view we have in the tricresol-formalin mixture a valuable addition to our medicine chest.

Its strong penetrating odor predominates the fetid odor in putrescent pulps; and its obtunding action is more powerful than that of carbolic acid, while its bactericidal action is as strong as pure carbolic.

There are three cresols on the market, of which Dr. Mayrhofer prefers the orthocresol for his treatments. They are all powerful antiseptics.

ITEMS OF INTEREST

The Question of the Pathogenic Qualities of the Streptococci in the Root Canal.

It is a well-known fact that teeth which have been treated most carefully may give rise to a periostitis at some remote period, without any apparent cause. Various hypotheses have been brought forward to explain the cause of such infections and the possibility of the presence of micro-organism. As a matter of fact, they were never totally removed from the canals at the time of treatment.

Mayrhofer says: "I was unable to destroy them totally and obtain permanent sterile conditions with the tricresol-formalin solution. Neither did I obtain permanent sterility with the thorough Callahan method."

It is surprising that germs are present in root canals for years and do not cause inflammatory conditions. I believe the inactivity of the *streptococci* is due to the almost total absence of oxygen in the dental canals as soon as the circulation within the diseased pulp is arrested. It is very unlikely that any oxygen should penetrate through the apical foramen, which is stopped up by partly coagulated or decayed albuminous material.

F. Fromme and Th. Heyneman claim their nature has not been fully determined. In the root canals the conditions necessary for their growth are at times very unfavorable.

In putrescent canals which have not been treated, we find a great number of other micro-organisms besides the *streptococci,* as bacilli and staphylococci. These may act as parasites and inhibit the growth of the *streptococci.*

In canals which have been treated, we may find dried-up pastes of zinc oxid or other materials forming a poor medium for the *streptococci* to grow on. Their virulence might thus be reduced and their action on the tissues retarded. We must have a favorable medium for them to thrive on, and this may take years to develop.

Reinfection may also be caused by the cracks and fissures in the enamel and dentine and leaky fillings, through which micro-organisms can readily permeate.

That the *streptococci* are the active pathogenic micro-organism is seen by their majority in every stage of periostial infection and by the principal part they play in erysipelas, puerperal fevers, pyemia, etc.

Root Canal Treatment.

When we deal with a putrescent root canal we have to distinguish between two distinct factors:

First, decomposition. Second, infection.

Both have been treated to this day by evacuation and sterilization of the pulp canal by antiseptics and chemicals. The

latter should not give rise to clinical symptoms, such as inflammatory conditions beyond the apical foramen, but at the same time should be penetrating and powerful enough to destroy any micro-organism in the recesses and canaliculi of the cementum. As yet we have no such agent at hand, though the tricresol and formalin mixture is spoken of repeatedly as producing sterile canals permanently. Investigations have shown differently. Miller says that the properties of an ideal root-canal filling are: (1) The material should not undergo decomposition. (2) It should have a lasting, though mild aseptic action. (3) It should be introduced readily and removed easily. (4) It should not discolor the tooth. (5) It should not irritate the periapical tissues.

Balsam Peru as a Root-Canal Filling.

Mayrhofer believes he has found these properties in *balsam Peru.*

Balsam Peru is of vegetable origin, being obtained from the tree *Toluifera Pereirae* (Baillon).

The white balsam comes from its fruits, the black, the one we are considering, from its bark. This latter consists of Cinnameine, 60%; Benzoic; Cinnamic Acid; Resin; Styracin; Vanillin; Peru; Resinol; Tannol.

It is mildly antiseptic. According to Suter it destroys *staphylococci* inside of twenty-four hours. It stimulates the formation of granulation tissue. It liberates antidotes, inhibiting the growth of bacteria. Although this production of antidotes goes on slowly, it needs but a small quantity of balsam to inhibit a comparatively large medium for the growth of bacteria. Its action is localized; it is not readily absorbed by the tissues. It does not dissolve in water, and shows positive chemotaxis.

Its advantages for filling the canal are as follows:

Its antiseptic properties, although slight, are permanent since the balsam is sealed into the canal lumen; and, as Suter states, it will destroy bacteria in twenty-four hours when in direct contact with them. Not only that, but it causes the production of antidotes which inhibit the growth of micro-organism in the immediate surrounding tissues. Since we have not at hand an antiseptic powerful enough to destroy the bacteria in the canaliculi of the cementum, balsam Peru will destroy them on their growing back into the pulp canal. Suter claims one drop of balsam Peru is sufficient to weaken the medium favorable for bacteria in an ordinary test-tube. How much more balsam relatively can be injected in a root canal.

Other filling materials, such as zinc-oxid pastes, gutta-percha points, etc., decompose, losing their aseptic properties. Balsam Peru does not.

It can readily be inserted by injection with a small syringe, of which

I shall speak in conclusion. The action on the periapical tissue is nil up to this present time. Only further investigation will solve this question.

It does not discolor the teeth. It is not porous, and seals the canal hermetically. It can be removed from the canal at any time as it does not change its consistency.

After the canals have been treated sufficiently to assume that they are sterile (Dr. Mayrhofer uses for this purpose a solution of ortho-cresol, washing them out with an abscess syringe and removing the débris with a Donaldson broach. Everyone has his own method of procedure), a glass syringe with metal point, straight or bent as may be the case, and filled with the balsam, is inserted into the canal openings and the fluid is forced into them.

I use for the purpose a small glass syringe with a long platinum nozzle with is fused to the glass, and which I can bend at any angle. With this I enter the canals as for as possible and inject. Then with a fine smooth Donaldson broach I release any air-bubbles which might be in the balsam within the canal, by pumping the broach up and down. The opening of the canals into the pulp chamber I seal with cement.

The procedure is easy. I leave the balsam in the syringe, as it does not dry up, and I keep it in my medicine chest.

If some balsam is forced through the apex it will set up a slight inflammation which will subside in a few days, without treatment.

In conclusion, I want to say that I have been using balsam Peru for too short a period to report my own observations and results from the same, although roots which I filled with the balsam seem to be doing favorably.

On account of pyorrhea, I had occasion to extract two teeth, from which I had removed the nerves two months previously and had filled the canals with balsam Peru. In both instances the balsam was still in the canals. This, of course, is not a final test, and Dr. Mayrhofer's observations along these lines run over a year.

Somnoform.*

A Report of Its Use as an Anesthetic During the Last Ten Years.

By Dr. G. Rolland,
Medical Superintendent of the Bordeaux Dental School and Clinic.

In 1901 a first report on Somnoform Anesthesia, based on the author's experience in the anesthetic department of the Bordeaux Dental School and Clinic, was read at the Congress of the French Association for the Advancement of Science, held at Ajaccio.

Used as an anesthetic it was shown to be rapid and reliable and easy of administration and could be used for dental and minor surgery.

(Somnoform at that time was composed of 60 parts of ethyl chlorid, 35 parts of methyl chlorid, and 5 parts of ethyl bromid.)

Somnoform evaporates at 0°C., a necessary condition for the rapid assimilation of this element by the blood, for the greater the tension of a gas in the pulmonary alveoli, the easier will it be absorbed.

Somnoform being such a very volatile gas is easily absorbed by the blood circulating in the lungs and carried to the other parts of the body. Its anesthetic effect commences in twelve seconds, and this can be easily explained:

The blood can be considered as a true gaseous solution, the various gases representing 45 per cent. of the total mass.

Each ventricular systole throws into the circulation from 135 to 180 grams of blood. As all the blood in the body weighs from 5 to 6 kilos, it requires 25 to 30 cardiac pulsations for the blood to have accomplished its passage through the body.

The normal heart has about 72 pulsations a minute. Therefore, it takes the blood about 25 seconds to return to the heart.

It also takes Somnoform 25 seconds to 1 minute to have its full anesthetic effect, the time varying with the idiosyncrasy of the patient.

Action of Somnoform on Nervous System.

Somnoform has a selective action on the cerebellum and it is only after this has become saturated with the anesthetic that the cerebrum is affected. This has been shown in a series of experiments which were reported at the International Congress of Medicine held at Madrid in 1903 (12th Section Odontological and Oral).

Certain animals were anesthetized with Somnoform and kept so for a short time; others were kept under the anesthetic for a much longer period (about one hour).

They were destroyed at the end of each experiment and sections were made from the cerebral and cerebellar cortex.

These sections were treated by various methods; some were prepared by Nissl's and Ehrlich's method and others by Golgi's.

All these preparations constantly showed that the cells of Purkinje were more easily destroyed or modified and in a shorter space of time than the pyramidal cells.

These experiments showed, a priori, the small dangers of Somnoform when given for short anesthesis, as unconsciousness is brought about by its action on the cerebellum, the cerebral cortex not being directly involved.

Microscopical Examination of the Blood of Patients under the Influence of Somnoform

At the Congress of the Swiss Odontological Society, held at St. Gall in 1902, the author, in collaboration with Dr. Muratet and Dr. Sabrazes (chief of the Clinical Laboratories of the Faculty of Medicine and professor to the University of Bordeaux), reported the investigations they had had carried out on the action of Somnoform and other anesthetics on the blood plasma.

Microscopical examination of the blood made before and after Somnoform anesthesia showed no important modification even after anesthesia had been prolonged 18 minutes.

The changes that were observed were in the physiological limits.

Before Anesthesia. Normal Blood.	During Prolonged Anesthesia. 18 Minutes.
Hemoglobin, 102 per cent.	94 per cent.
Red Corpuscles, 4,991,000 per c. mm.	4,501,200 per c. mm.
Whte Corpuscles, 6,000 "	4,960 "

The Red Corpuscles Were Normal. White Corpuscles.	PER CENT.	The Red Corpuscles Were Normal. White Corpuscles.	PER CENT.
Polynuclear Neutrophiles	67.48		65.92
Lymphocytes	26.60		31.84
Mononuclear	1.90		0.63
Cosinophiles	1.25		1.60
Martzellen	0.38		
Transitional forms	1.24		

With regard to hemolysis we came to the following conclusions:

With an open tube of blood Somnoform, more volatile than chloroform or ether, does not produce hemolysis, though the other two anesthetics do.

With a closed tube and with increasing amounts, chloroform "lakes" the blood first, then Somnoform and lastly ether.

Blood Pressures. At a congress held at Shrewsbury in 1902, in a communication on blood pressures made to the British Dental Association, Drs. G. Rolland and Field Robinson reported that during Somnoform anesthesia of five-minutes' duration, the pulse, which had registered 72 beats per minute before the induction of anesthesia, varied in the following manner dur-

ing the ensuing minutes: 84, 76, 68, 68, 68. The normal blood pressure of a patient was 13½, it rose during the induction of anesthesia to 14½, was 15½ while unconsciousness lasted and fell to 12½ on the patient awakening.

The respiratory movements which were 16 per minute before anesthesia were 28, 20, 19, 20, 20 during the succeeding minutes of unconsciousness. The authors came to the following conclusions:

That clinical experience confirmed the laboratory studies that Somnoform anesthesia was quite safe, as the only effect it had on the heart and lungs was slightly to increase their respective rate of action.

Clinical Study of Somnoform Anesthesia.

Here, as in all clinical study, we found an infinite variety of cases and we studied both the subjective and objective phenomena presented by our patients.

The subjective phenomena were with few exceptions practically the same in all cases, and a common description will suffice.

For the objective phenomena we divided our cases into three classes: The docile, the struggling, and the excitable.

Subjective Phenomena.

The study of these phenomena allows us to establish three definite periods.

First Period—The Induction.—The patient is generally anxious for the first few inspirations. Some lose consciousness at once, others understand and answer the encouraging words of the anesthetist for a longer or shorter period. Others feel an increased mental excitability at first, which gradually subsides as they sink into unconsciousness; at other times they think they are being carried away and hear the sounds of an engine puffing. They feel a kind of numbness, which first invades the extremities and then the whole body. These are the phenomena most commonly observed.

Second Period.—No phenomena are observed as the patient is unconscious.

Third Period.—Return of consciousness. The sense of hearing, which is the last to disappear, is the first to return. The patients dream either pleasantly or otherwise; these dreams are generally forgotten on awakening. They give forth expressions of gaiety, drunkenness, love, fury, religious ecstacy, or speak of occurrences in their daily life; but what we found was nearly constant in all cases and is due to the action of Somnoform on the cerebellum was that they lose all notion of where they are and they return to consciousness by degrees and understand the ridiculous things they have been thinking and saying.

Objective Phenomena.

The patients are divided into three classes: the docile, the struggling and the excitable.

The Docile Cases are in the proportion of 90 per cent. After the mask is applied, containing from 3 to 5 c. c. of Somnoform, these patients breathe quietly and may make few efforts at swallowing. The appearance of the face is not modified, but after the first four or five inspirations, one notices a slight redness of the cheeks. When unconsciousness supervenes, the pupils dilate and the eyelids close. The time taken is from fifteen seconds to one minute. During the period of unconsciousness these cases sleep quietly and peacefully. This period lasts from thirty seconds to five minutes at most. Five-minutes' unconsciousness is rarely obtained with doses of 3 to 5 c. c.

Return to consciousness is shown by slight fibrillary twitching of the eyelids and a slight redness of the face. After a short but variable time the patient sits up, he can walk without hesitation or giddiness. There may be slight mental excitability both in speech and gesture which soon passes away.

The Struggling Cases.—These are in the proportion of 8 to 9 per cent. When the anesthetic is started these cases are excited, nervous and are not quieted by explanations or encouragement. As soon as they feel the mask applied to their face, they try to pull it away, the gag falls out, they struggle, cry out, their faces become red, they swallow continually and do not breathe. At last they make a few big inspiratory efforts, become very stiff, and at last lose consciousness and breathe stertorously.

The time taken is thirty seconds to one and a half minutes, the unconsciousness lasts longer than usual; the patient's appearance is at times cyanotic and they sometimes pass their water.

Return to consciousness is accompanied by fighting, excitability and redness of the face is present, both of which may persist a certain time. There are some rare cases in which the patient falls into a sort of prostration, which may last from a few moments to one hour. In the struggling cases we have to deal with reflex phenomena, the patients are not themselves, their brains have lost all power over their actions.

The Excitable Cases.—The nervous, alcoholic, smokers, epileptics, etc., are placed in this class. These cases show immediate and late phenomena. They take a long time to anesthetize and afterward may have regular fits, eliminate the anesthetic with difficulty and have various complaints, such as vomiting, inability to get warm and a tendency to sleep.

Uses of Somnoform.

At first Somnoform was given on a pocket handkerchief. Since then its administration has been improved, thanks to the employment of various forms of apparatus that allow the patient to be anesthetized with minimal doses which can be increased gradually without removing the mask from the face.

At the Dental Clinic of Bordeaux alone, where this product is being constantly studied by the author and the various physicians and dental surgeons who attend the clinic, Somnoform has been given over 200,000 times—to children, adults and old people with various complaints. The various phenomena that we have described have been studied in these cases.

The physiological experiments that we have carried out explain in a large measure the innocuity of this precious anesthetic.

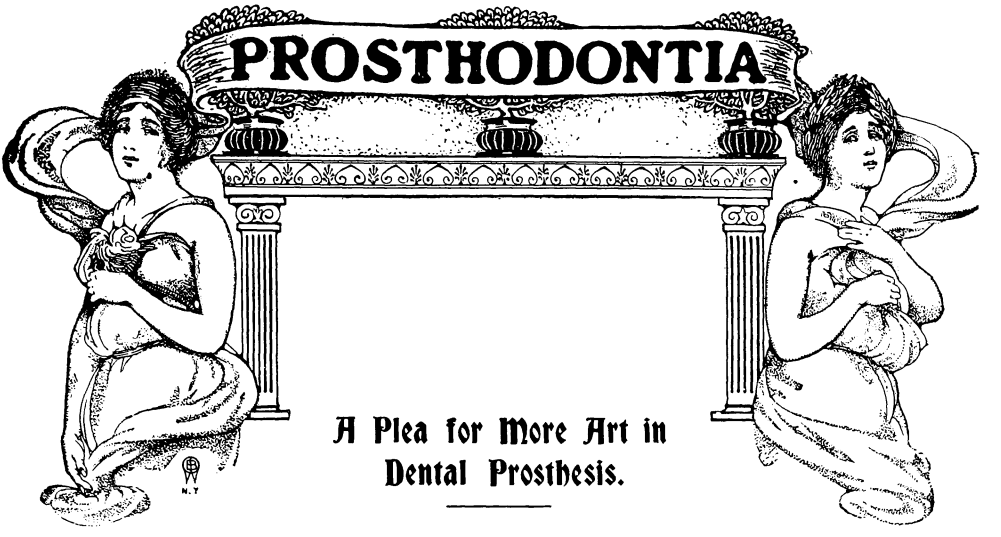
But the great advantages and success in its use which we have described are in a great part due to the reduction of the amount of ethyl bromid that was effected in our advice. Ethyl bromid is an exciting agent, it evaporates badly and is eliminated with difficulty by the organs.

The perfected formula of Somnoform, the dose of which is 3 to 5 c. c., is at present this:

	PER CENT.
Ethyl chlorid	83
Methyl chlorid	16
Ethyl bromid	1

In the French hospitals and principally in those of Bordeaux, Somnoform is in daily use for all surgical operations, both large and small, and it is easily ascertainable that up to now this anesthetic has been administered over two million times without a single failure.

The writer thinks that during the last twelve years, during which he has published reports on the use of Somnoform, he has rendered a great service to all patients wo have had to be anesthetized and to the anesthetists and dental surgeons whose various forms of apparatus have been much simplified. To conclude, Somnoform is an anesthetic that can be administered with great ease and it also acts quickly and certainly and produces unconsciousness for a sufficient length of time.



A Plea for More Art in Dental Prosthesis.

By Jas. P. Ruyl, D.D.S., Brooklyn, N. Y.

Read before the Second District Dental Society, November, 1909.

In my paper I will try and be brief and hope that some of you will be benefited. Nor do I expect to reach all, for much that I shall say will already be known by a great many. If, however, a few are helped, I shall be amply repaid for my efforts.

Nature has worked wonders in our human make-up, and it has been our fortune to restore to the body certain parts which in many instances are lost. Teeth, like hair, are a woman's greatest charm, and, as we deal mostly with women, I shall not particularly mention the male sex. It is certain that he who attains results nearest to nature is the most artistic operator.

Artistic Crowns.

In making crowns, both gold and porcelain, I have noticed how little effort is made to imitate nature in the general form of the tooth. You have all of you, doubtless, seen a great many cases where a tooth would be cut down and a gold shell put over it, with absolutely no regard for form; where it looked more often like a miniature stove-pipe with a top, than like a tooth; never any attempt at cutting away that part which conforms to the shape of the gum, but pushing it down underneath, in one place sometimes one-sixteenth of an inch, while in another the edge would be barely covered. This, to my mind, is all wrong, and, with the present knowledge of our art, we should do to our patients a little more as we would be done by.

Molars and bicuspid teeth that previous to crowning would be too close together to admit of foods getting between them, are, after crowning, often worse than if none had been put on, because no contour was made on the sides of the teeth to allow the gold to come up close against the adjoining one. Cases of this kind produce no end of annoyance and discomfort to the patient, and when she comes back to relate her trouble, the only consolation one can offer is that a piece of floss or quill tooth-pick will keep it clear.

The same cases arise in porcelain crowns. We often see very excellent joints between the porcelain tooth and the abutting root, but with no selection as to width and color to meet the surrounding requirements. What we mostly see in porcelain crown-setting is, the tooth at the cervical margin, entirely too large in circumference for the root, or entirely too small, with no thought given to grinding the sides of the porcelain tooth to make it flush with the root. Then, in a few years, we wonder why we have absorption of the tissues and are very apt to condemn porcelain crowns when it is not the fault of the crowns, but entirely the fault of the operator.

In bridgework also, we often advise patients to have full gold bridges put in, spanning a space, we will say, from the canine to the second molar, all done up in gold? Surely, we know that a bridge constructed with porcelain teeth would not only look better, but would more nearly imitate the natural condition. To my mind, the crowning of any of the six or eight anterior teeth with gold is barbaric. Sometimes, when teeth have been removed for a long time, absorption has taken place to such an extent that it is necessary to restore lost tissue; but often, oh, how often, do we see bridges over these spaces made up of unsightly, long, plain teeth, having their cervical margin at least one-eighth of an inch higher than the remaining one in the mouth, instead of gum teeth, whereby you could keep the cervical margin of the artificial tooth in harmony with the adjoining natural one, and in addition restore the lost tissue by the gum. Many of us have put in bridges of this kind, knowing in our hearts that better work could have been done, hoping that the patient would not go out of our community or seek the services of some other dentist within ten years, when we could soothe our consciences by saying, "It looks bad now, but it looked better when it was put in."

And we see the same results in artificial dentures. In this work there has been no progress since the introduction of rubber plates, through no fault of the manufacturers, for they produced proper materials at first, but, as there was no demand, they brought out only what the profession bought. We select one color, perhaps of our patient's lower centrals, go to our dental depot, get a set of fourteen teeth,

all of that one color, make them up as evenly as we know how—often three or four sizes smaller than they should be—wax up the case on the model almost of any thickness, add an air-chamber, finish up the plate, and put it in the mouth. Then we tell our patient it looks fine, and when she smiles, showing her second molars, we receive a shock; but so many times have we felt this shock that we grow callous.

Let me set forth a little more definitely the methods which will help to bring about more natural, and hence more artistic, results.

Technique for Gold Crowns.

In making gold crowns, first take a measurement around the neck of the tooth, and cut a strip of gold so that the top part of it is a little larger than the part which goes around the neck. When soldered, this will produce a bell-shaped band. Fit this over the tooth,

Fig. 1—Imitation of natural formation in gold where roots are exposed from ⅛ inch to ½ inch.

being sure to cut away sufficient gold from it to festoon to the gum line, and make the band fit evenly a little below the cervical margin. Then, with the aid of regular contouring pliers, contour the band to harmonize with the surrounding teeth. Cut off enough from the top of the band to permit an occlusion without touching it, then take a piece of wax, put it in between the teeth and get your patient to bite upon it. While you are pressing against the buccal surface with your finger, let the patient crowd her tongue against the lingual surface. Put your band back into the wax and make a cast of the same. Set it on an articulator, take out your wax, and you will have the band in the plaster just as it fits in the mouth; then take some plaster, put it inside the band and close the bite, but before doing so add a little shellac, that the bite may be opened more readily. Carve the plaster to suit the occlusion, and get a perfect occlusion throughout. With the tooth properly carved, dip the plaster cusp into dentallac and proceed to strike up the cusp with the usual swagers now on the market. Then file the top of the band and the bottom of the cusp level, and the two parts will fit together perfectly (Fig. 1). Put flux on the joints only, and solder from the outside. You can then reinforce to suit the case, proceed with polishing, and with no grinding at all put the crown back upon the root (Fig. 2).

Porcelain Crowns. With porcelain crowns employ the usual method, selecting a tooth to match in color and contour the natural one next to it. Grind a hole in the root, not a round hole, which would allow play, but an oblong one as nearly as possible the shape of the pin which is to be inserted. When you use a round pin, make the hole large enough, so that it will be a snug fit, permitting no play. Make no attempt at grinding the crown for the joint until you are sure of the position of the crown in its place, bending the pin a little, if necessary, to go higher in the root. Often in doing this you will need to take off some of the lateral surfaces to

Fig. 2—Finished crown on articulator showing good occlusion at all joints.

allow it to go up between the teeth, but under no condition cut off the end of the pin unless you have an unusually short root, for here is where the crown gets its strength. You will then have no difficulty in making an almost perfect joint in a very few minutes, and you take out the crown and put it back into place, feeling sure there is only one way it will fit. Then, if the color selected is not exactly in harmony with the surrounding teeth, you can very easily color it up to suit with the aid of different porcelain bodies now in use—mineral stains of brown, blue and yellow. If it is impossible to get a tooth of the required length from the manufacturers, use a piece of platinum or gold-foil one seventeen-hundredths of an inch in thickness; press this against the root with cotton or chamois disks, and, aided by the burnisher, press the overlapping foil between the root and gum. You will now have an absolute adaptation of the foil against the root. With a sharp instrument puncture a hole through the foil leading to the canal, add some sticky wax around the neck of the crown, and press the whole mass into place. Be sure the foil is dry to admit of adhesion of the wax to the foil, and then withdraw the entire

mass. Invest the pin up to the foil in investment material, wash out the wax and fill in between the foil and crown with any of the porcelain bodies, either the low or high fusing, at your own discretion. After baking you will have a perfect fit to the root, and one which will be almost impossible to detect as artificial.

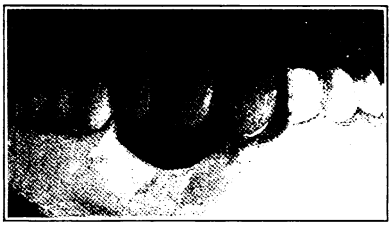


Fig. 3—Restoration of absorption with hand-carved gum block.

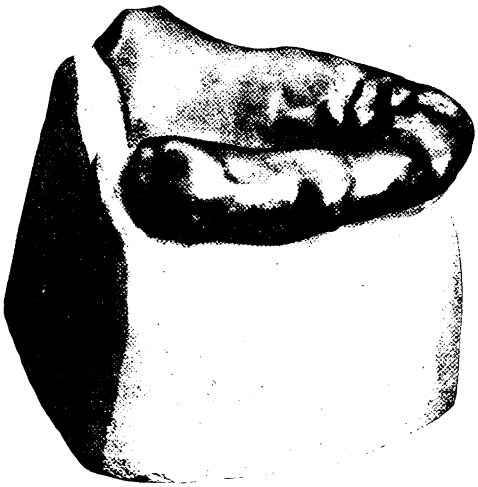


Fig. 4—Metal base plate swaged on plaster model, showing rugæ and giving even thickness for rubber plate.

Artistic Bridgework.

Perhaps bridgework offers the best field for artistic work. With hand-carved blocks (Fig. 3), judicious use of color, and proper arrangement, results may be obtained which will exactly copy natural conditions. Of course, in many instances, hand-carved blocks or gum teeth would not be necessary where there has been no absorption, and plain teeth may be used by selecting different shades to make them look natural.

Impressions for Artificial Dentures.

In artificial dentures I first get the patient to rinse out her mouth with cold water. In a warm mouth the tissues are expanded, and by contracting them you get a smaller impression; for if your patient has been wearing a plate and you attempt to take an impression immediately after she removes it, your impression will not be so accurate as if she used the cold water. She may be doing this while you are preparing the impression material and so save time. Then proceed with the impression. I use Dr. Greene's method and am convinced that those of us who saw his demonstration two winters ago must feel with me its superiority over all others.

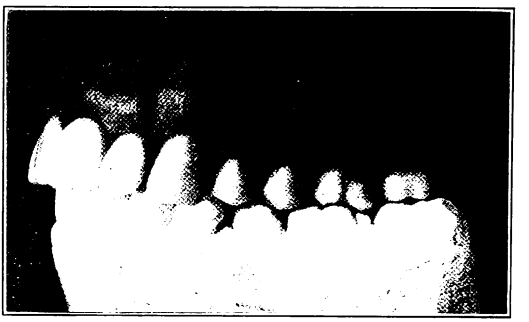


Fig. 5—Full upper denture, showing natural arrangement of teeth with marked overbite of six interior teeth.

Take some Detroit modeling compound (I have found that best), and allow it to come to a cone shape in the center of an almost flat cup with the sides cut away. Have hot water at the side of your chair for immediate use and pass the modeling compond, now soft, and the impression cup over an alcohol flame, getting it to the point just before it begins to run. Wet your patient's lips with fingers dipped in warm water, and follow this up immediately with the impression material, endeavoring to get only the palatal surface of the mouth. Hold it firmly in place and chill, then take it out and add some more warm modeling compound on one side of the impression and put it back into place, pressing gently with the finger to get the outside of the ridge. Do the same on the other side. You will now have what looks to you like an almost perfect impression, but you will find that across the heel the modeling compound has sagged just as it does in all plaster impressions, which accounts for so very few being accurate. Add more soft modeling compound across the heel and squeeze it back into place. Now the modeling

compound and impression cup will hold in place and the lips can be pulled up or down, as you see fit, without throwing down the impression.

Make a cast from this impression. From the cast so obtained take another impression in modeling compound for your bite. This can be trimmed down or added to for as much fulness and length of bite as the patient requires. This compound does not lose shape when being put in or removed from the mouth as the old wax bites did. Heat over

Fig. 6—End-to-end bite in person 74 years of age, showing marked degree of wear.

Fig. 7—Carved full upper, showing rugæ and cervical margin of teeth in rubber.

alcohol flame that part of the compound against which the lower teeth will strike and get the occlusion. After the impression is taken swage a piece of soft tin (twenty-two-gauge) for a base plate upon the plaster cast. This is to provide for the plate's even thickness and also bring out the rugie, and at the same time give you a stiff base-plate to try in the mouth. I do my swaging between two rubber blocks, and, in order to get an even pressure throughout and so prevent breaking, I make my model as deep as it is wide (Fig. 4).

Now select your teeth, and instead of taking the fourteen provided by manufacturers, use two or three sets of slightly different colors, taking a lighter shade in the centrals and laterals, and perhaps two shades darker for the canines, using again the lighter colors for the bicuspids and darker for the molars (Fig. 5). This, when made up, will give a harmonious arrangement of color more satisfying to yourself and to your patient. How often do we see sets of teeth in light colors made up for old people when dark ones would be much more suitable to their complexion and temperament; and here again for old people the mineral stains of brown and yellow are very useful for coloring up necks of teeth to imitate the colors of old age (Fig. 6). Six or eight teeth can easily be baked at the same time on a fire-clay slab, and the result will

be most satisfactory. Instead of setting up the teeth evenly all around, try to place them a little more unevenly, because in seventy-five per cent. of the natural sets there is some slight irregularity. If we could leave the teeth as we first put them on the waxed case, trusting as it were to our first arrangement a certain carelessness, naturalness, we would often copy the natural condition more nearly. After the teeth are set up in the mouth and you get the fulness and length to your satisfaction, the carving

Fig. 8—Hand-stained full upper, showing worn condition of occlusal surfaces and discoloration of dentin.

on the lingual surfaces should be carried out (Fig. 7). This makes not only a lighter plate, but a much more comfortable one and one to which the patient can become more readily accustomed. When the carving is finished, make a glazed surface over the wax with a mouth blow-pipe and wipe it off carefully with a pledget of cotton or a camel's-hair brush saturated in chloroform or vaseline. You are then ready for vulcanizing, after which a very few minutes' work with the scraper will prepare your plate for polishing.

The Laws of Antagonization of the Teeth in Orthodontia.

By Leuman M. Waugh, D.D.S., Buffalo, N. Y.

Read before the American Society of Orthodontists at Cleveland, October, 1909.

It will be the endeavor of the writer to review the anatomic features of the temporomandibular articulation as it exists in the *living* human subject, and to direct attention to the definite and positive part it plays in controlling the contact relations of the teeth of the two jaws. From this fundamental study it is hoped to make clear certain essential principles governing the universal arrangement of the teeth, so that normal jaw movement may be carried out with harmonious tooth contact, in accordance with Nature's plan. This, in the writer's mind, will supply the basis from which will be evolved a broader and truer science of orthodontia, by which he obviated the present-day perplexing problems of treatment and retention, and of supra- and infra-occlusion.

As dental nomenclature has not been reduced to a science, it will be best first to define a few terms as they will be used in the paper.

Definition of Terms.

"Antagonization," will imply the contact relations existing between the teeth while the mandible is in motion, or, in other words, when either or both condyles have been moved from their resting position in the temporomandibular joint.

"Articulation" will be restricted in use to the description of the temporomandibular joint.

"*Occlusion*" will imply the contact relations existing when the teeth of the upper and lower jaws are shut and the mandible is at rest.

"*Normal occlusion*" is possible only with an ideal arrangement of the teeth.

"*Natural occlusion*" will imply occlusion with either normal or abnormal arrangement of the teeth.

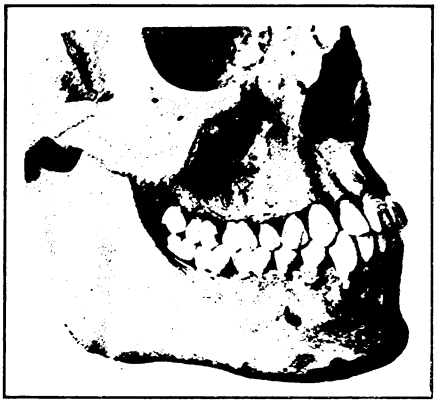


FIG. 1.

Fig. 1.—Normal occlusion from buccal aspect. Note the interdigitation of the buccal cusps, the overlap and the buccal compensating curve.—(Broomell.)

"*Overbite* will imply the distance from the lingual surfaces of the upper anterior teeth to the labial surfaces of the lower anterior teeth when the jaws are closed.

"*Overlap*" will imply the distance that the upper anterior teeth extend down over the lower anterior teeth when the jaws are closed.

Occlusion.

It will be best to first briefly review occlusion. Normal occlusion, it should be remembered, must be regarded as an ideal condition, but rarely found in any type of individual (Fig. 1). A knowledge of this perfect arrangement is of the utmost value, not alone in orthodontia, but in every branch of dentistry, and has practical application from the period at which the deciduous teeth are fully erupted to the time when the construction of complete artificial dentures becomes necessary.

In studying the occlusion of the lateral half of the jaws, it will be observed that each tooth has two antagonists in the opposite arch, except the lower central incisors and the upper third molars (Fig. 2). In

the incisors and cuspids the labial surfaces of the lower rest upon the lingual surfaces of the upper. Bonwill believed that the extent of this overlap corresponds to the depth of the cusps of the bicuspids. This may serve as a general, but not an accurate, guide, as will be understood later.

The bicuspids and molars on each side, viewed collectively, consist of a series of cones or cusps, bounding fossæ or depressions (Fig. 3). These are so fitted together when the teeth are in occlusion that the fossæ receive cusps of the opposing teeth, forming some thirty mortars and pestles for the trituration of food. The line of the lingual cusps of the

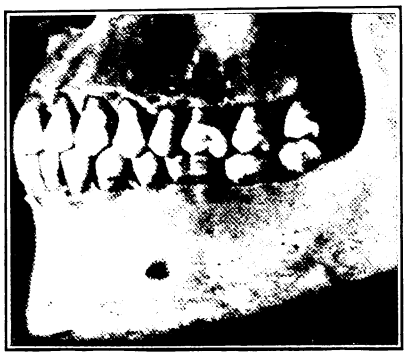


FIG. 2 (BUCCAL).

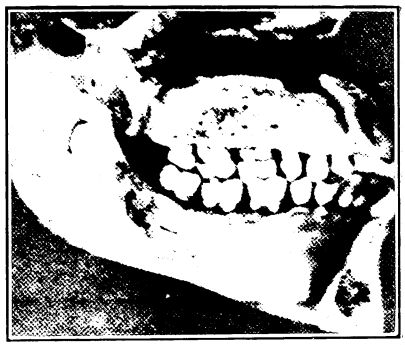


FIG. 2 (LINGUAL).

Fig. 2.—Occlusion from both buccal and lingual aspects, showing some thirty mortars and pestles for the trituration of food.—(Turner, from a skull in the Wistar Institute of Anatomy.)

upper are received into the groove between the buccal and lingual cusps of the lower, while the buccal line of cusps of the lower are correspondingly received into fossæ of the upper. The lingual cusp of the first upper bicuspid is received between the buccal and lingual cusps of the two lower bicuspids, its point corresponding to the line between the mesial marginal ridge of the second, and the distal marginal ridge of the first.

The lingual cusps of all the posterior teeth interdigitate more or less similarly. The inclined planes antagonize those of two opposing teeth, except the upper third molar, which contacts but one tooth, the distal planes of the posterior cusps being disengaged. The summit of the buccal cusp of the upper first bicuspid is placed on a line with the interproximal space between the two lower bicuspids and to the buccal side.

The general arrangement of the second bicuspid and molars is relatively similar. The lower third molar contacts two upper molars.

Antagonization.

The *antagonization* of the teeth is a mechanical problem, and its comprehension necessitates an understanding of the universal anatomic peculiarities of the temporo-mandibular articulation and the *resulting* movements of the mandible as they exist in the living subject. These joints are complex and bilateral, and afford freer movement of the mandible than exists with any bone in the body. Each of the condyles of the mandible articulates with the glenoid fossa of the corresponding temporal bone (Fig. 4). The

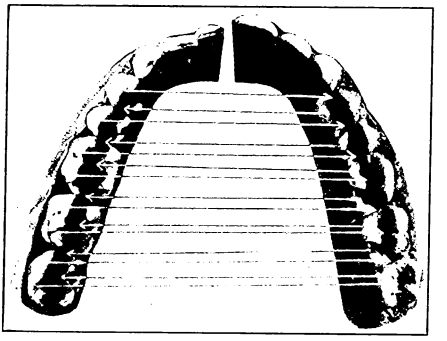


FIG. 3.

FIG. 4.

Fig. 3—Showing a lateral half of the corresponding upper and lower arches, the arrows designating the positions of the various cusps in occlusion.—Turner.

Fig. 4—Showing the bony relations of the condyle and glenoid fossa.

fossa is situated at the root of the zygoma, and is a mere depression, *not* corresponding in shape with the condyle which it receives, and which occupies only a part of it, the rear portion of the fossa containing a part of the parotid gland. The articulating surface for the condyle extends forward, beyond the fossa, on to a prominence, the *eminentia articularis*. Here it should be noted that the articulating face is inclined forward and downward (Fig. 5). The condyle is suspended from the temporal bone by means of (Fig. 6): (*a*) the capsular ligament, which is attached below to its neck, and above to the edge of the articulating surface of the fossa and the *eminentia;* (*b*) by the stylo-mandibular ligament, which extends from the styloid process downward and forward to the ramus near its angle; (*c*) the internal lateral ligament, which extends from the spine of the sphenoid to near the posterior dental foramen of the mandible. It will thus be seen that the mandible is permitted free forward move-

ment. Its backward movement is controlled by the external lateral ligament (Fig. 7), which arises from the posterior portion of the zygoma, and possibly from the post-glenoid process. This ligament plays an important part in the mechanism of the joint. Interposed between the condyle and the fossæ is the interarticular cartilage (Fig. 8). This is oval in shape, thin in the center—occasionally being perforated—thicker at the edges, especially the posterior, its circumference joining the capsular ligament.

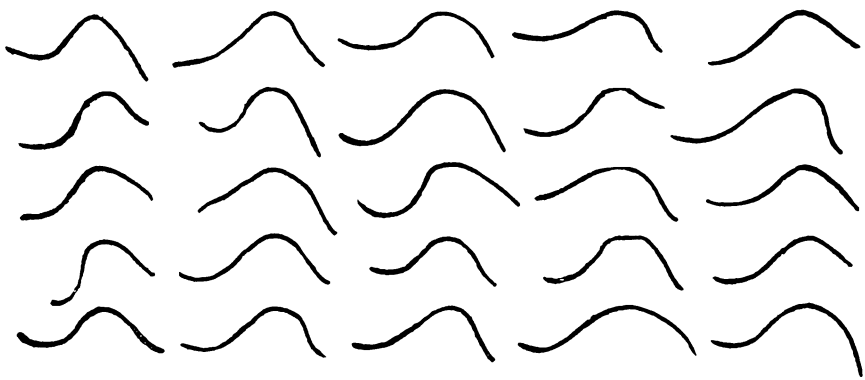


FIG. 5.

Fig. 5—Showing tracings of the lower outline of twenty-five glenoid fossæ, including part of the eminentiæ articularis. Note that the angle of descent varies markedly, yet in all it is forward and downward.

There are two synovial sacs, one below the cartilage, interposed between it and the condyle, the other above the cartilage, placed between it and the fossa. The upper synovial sacs afford a free direct forward movement to the mandible, it being advanced by the external pterygoid muscle, which is inserted into the cartilage and neck of the condyle (Fig. 9). When both external pterygoids contract simultaneously, the two condyles move forward in their respective paths, and the mandible is protruded. If one of them contracts, the condyle is drawn forward in its path, while the one of the opposite side, remaining in its socket, becomes the pivotal point, the mandible being moved laterally. The teeth on the pivotal side pass transversely and almost on a direct bucco-lingual line, while those of the opposite or "excursive" side move forward in the line of the arch with a slight inward curve (Fig. 10).

When the mouth is opened the condyle moves first on the lower synovial sac; then, when the lower edge of the external lateral ligament is rendered tense by the backward swing of the ramus, the point of insertion of its lower edge becomes a new center of motion (Fig. 7).

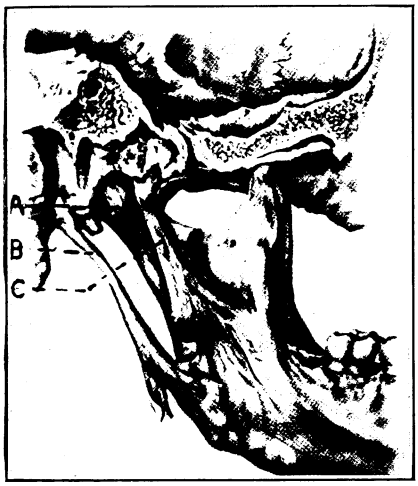
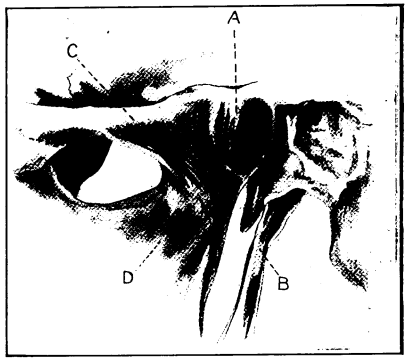


FIG. 6.



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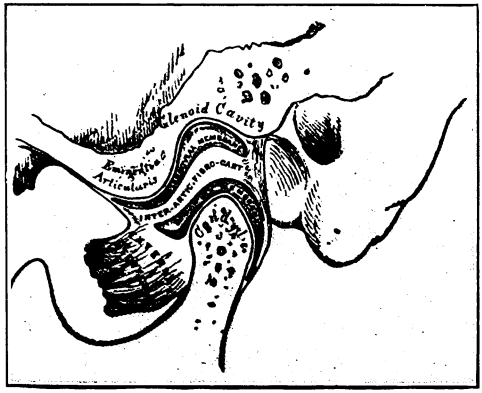


FIG. 8

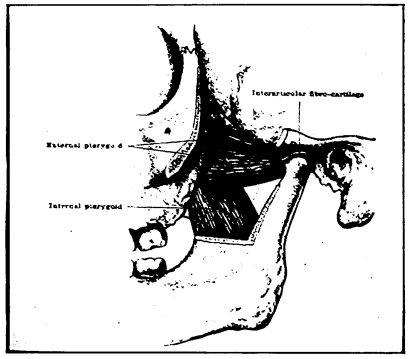


FIG. 9.

Fig. 6—The mandible suspended from the temporal bone, lingual aspect. (a) Capsular ligament; (b) stylomandibular ligament; (c) internal lateral ligament.—(After Deaver.)

Fig. 7.—The mandible suspended from the temporal bone, buccal aspect. (c) External lateral ligament; (a) capsular ligament; (b) stylomandibular ligament; (d) ramus.—(After Deaver.)

Fig. 8.—Vertical section through the temporomandibular articulation.—(Gray.)

Fig. 9.—Temporomandibular articulation. The ramus partly removed to show pterygoid muscles. Note the insertion of the external pterygoid partly into the interarticular cartilage.—(Morris.)

The neck of the condyle turns upon it, and its articulating surface with the interarticular cartilage, moves forward upon the *eminentia articularis*. If the mouth is opened very widely, as in yawning, the condyles pass still farther forward along their respective paths.

Disregarding the topography of the masticating surfaces of the teeth, it will be seen that, in motion, the occlusal surfaces will describe two

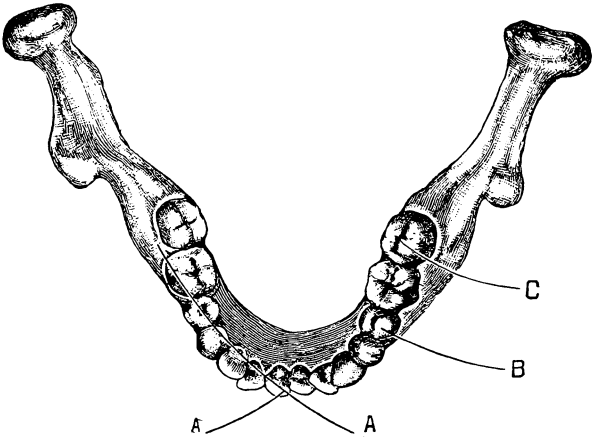


FIG. 10.

Fig. 10.—The mandible showing the occlusal surfaces of the teeth. The lines, a, a, are in the direction of tooth movement on the excursive side, b and c on the pivotal side.—(Snow.)

compensating curves, the one extending antero-posteriorly, "the curve of Spee," and the other passing laterally or at a right angle—more or less—to this (Fig. 12). Therefore, when viewed from the buccal, an imaginary line intersecting the cusps of the upper and lower teeth will be curved, the concavity being upward. This curve, if continued backward, will very frequently coincide with the curve of the condyle path. When viewed from the anterior, it will be found that the lingual cusps of the lower posterior teeth are placed on a lower plane than the buccal cusps, and that the lingual cusps of the upper assume a relatively lower position than their buccal cusps (Fig. 11). *The extent of curvature is dependent upon the descent of the condyle path; therefore,* when its inclination is marked, the compensating curves will be relatively deep (Fig. 30). If the condyle-path were horizontal, there would be no curve in either direction, and the plane of occlusion would be flat and on a parallel with the condyle-path (Fig. 31). If an arc be struck from above, having the same radius as that of the buccal compensating curve,

and from a center located on the median line of the face, it will intersect the tips of the buccal and lingual cusps of the teeth on both sides of the jaw. This is the lateral compensating curve. Please note that the two curves represent arcs of the same sized circle (Fig. 12).

FIG. 11.

Fig. 11—Note in the mandible on right the lingual inclination of the occlusal surfaces of the molars and bicuspids.—Prothero, *Dental Review.*

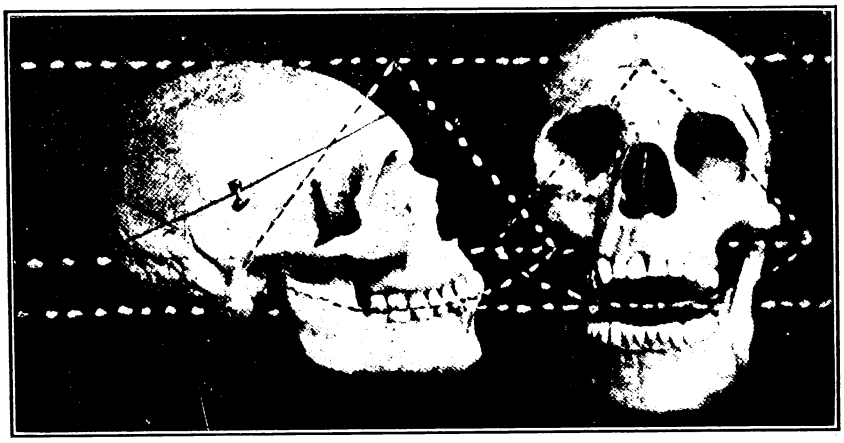


FIG. 12.

Fig. 12.—The same skull, viewed from both buccal and anterior. The lines show that the buccal and lateral compensating curves correspond.—(Prothero in *Dental Review.*)

Taking into consideration the occlusal surfaces of the teeth, it will be found in the ideal antagonization of the teeth that the cusps, fossæ and grooves correspond and move upon and into one another with a precision that closely approaches mathematical exactness. When the mandible is moved to the left side, the buccal row of cusps of the lower teeth on the right move upon the lingual row of cusps of the uppers with

uniform and undisturbed contact, while on the left side both buccal and lingual rows come into contact with their antagonists with the same nicety. When the mandible is moved to the right, the buccal row of cusps of the lower teeth glide upon the lingual row of cusps of the upper, while both the buccal and lingual rows abut those of the opposite jaw. The anterior teeth will overlap so that their incisive edges will just clear.

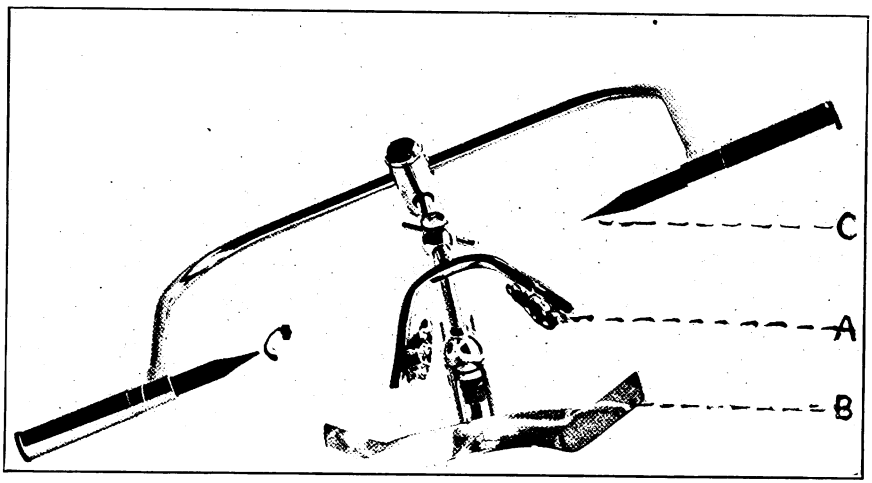


FIG. 13.

Fig. 13.—An instrument made to record diagrammatically the movement of the condyles. It is an elaboration of the Snow face bow, (a) is passed into the mouth and placed on the lower teeth. (b) Rests beneath the chin and, when clamped, fastens immovably to the teeth. The pencil points (cc) are adjusted over the condyles and will follow absolutely their course as the mandible is moved.

There will be neither a dragging of the cusps nor a perceptible space between them. The extent to which the anterior teeth may overlap is determined both by the pitch of the condyle-path and the depth of the cusps of the bicuspids. With a decided descent of the path and deep cusps to the bicuspids there can still be comparatively little overlap, unless there is considerable overbite.

The movements of the condyle upon the *eminentia articularis* can be recorded diagrammatically by means of an instrument capable of firm attachment to the mandible, and having an arm which will carry a pencil so that the point will touch the cheek directly over the center of the condyle (Fig. 13). This is an elaboration of the Snow Face Bow, and proves the correctness of the variance in the pitch, curvature and asym-

metry of the condyle-paths. The point will follow exactly the movement of the condyle (Fig. 14). Usually the diagrams thus obtained are more or less curved, the concavity facing upward (Figs. 15 and 16). The amount of both curvature and inclination varies in different subjects, and frequently on the two sides of the same subject (Fig. 17).

FIG. 14.

Fig. 14.—The instrument shown in Fig. 9, adjusted to the face.

Walker has pointed out some fourteen years ago that the average angle of descent of the condyle-path is 35 degrees, and that it varies from the horizontal to 50 degrees. As an instance of asymmetry of the paths he mentions two cases, one in which its angle with the occlusal line was 1 degree on the one side and 10 degrees on the other, and one with 22 degrees on one side and 44 degrees on the other (*Dental Cosmos,* 1896, January and July).

From the foregoing study it will be understood:

First.—That the contact existing between the teeth of the upper and lower jaws is governed by the temporo-mandibular articulation.

Second.—That a general knowledge of this joint is necessary to the comprehension of the fundamental principles underlying the antagonization of the teeth.

Third.—That in no two individuals is the joint formation identical; and that in many cases there is a considerable variance in the two sides of the same individual.

Fourth.—That a study of its formation and varied movements in the living subject would require too much time for each case in every-day practice.

FIG. 15.

FIG. 16.

Fig. 15.—Resulting diagram of the condyle-path marked on the face, right side.

Fig. 16.—Resulting diagram of the condyle-path, marked on the face, left side. Note that they vary slightly in curvature and inclination.

It will thus be seen that, to be practical, the study must be readily made outside the body, and that any given case will possess individual characteristics of practical importance. As these facts became gradually recognized they compelled the production of mechanical devices by which the relations which exist between the occlusal planes of the maxillæ and the condyle-paths might be reproduced, and the various movements imitated with sufficient accuracy for practical application.

This, it seems, had a more urgent practical bearing in the construction of artificial dentures and evidently stimulated the prosthodontist to

endeavor in this field, as it is to him that the profession owes the debt of gratitude for its invention. But while these principles have so far been confined to the construction of artificial dentures, the cycle of its application is now complete in that its worth will be recognized in orthodontia, which branch of dental science should be practiced only on the young. Therefore, the breadth claimed for the application of these principles earlier in the paper is surely based on logic.

A very brief reference to its evolution will be of interest and serve to give a better idea of the efficiency of the present apparatus.

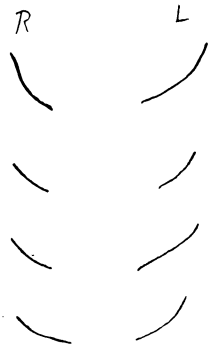


FIG. 17.

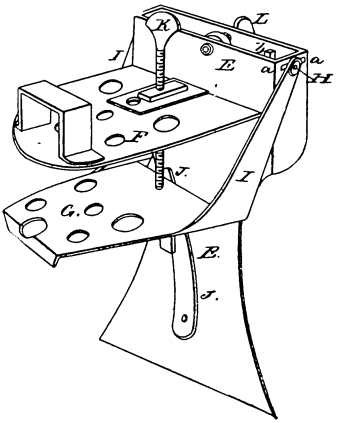


FIG. 18.

Fig. 17.—The diagrams of four condyle-paths. Note the variance on the two sides.—(Snow.)

Fig. 18.—First known effort to construct an anatomic articulator. The patent was granted to David T. Evans, of Philadelphia, in 1840. It shows at (a) the slotted joint for imitating the lateral and protrusive movements.

History of Anatomical Articulators.

The first recorded effort was made some sixty-nine years ago by David T. Evans, of Philadelphia. In 1840 he patented an articulator in which the joints were slotted, for the purpose of imitating the lateral and protrusive movements of the mandible. The slot representing the condyle-path is deficient in that it is horizontal (Fig. 18).

W. G. A. Bonwill (Fig. 19), also of Philadelphia, in 1858 gave the profession his articulator, with which all are familiar. This instrument is faulty in two important principles: (*a*) the condyle-paths are parallel with the occlusal plane; (*b*) it will not permit of adjustment to the

FIG. 19.

FIG. 20.

Fig. 19.—Dr. W. G. A. Bonwill and the articulator of his design supporting a set of teeth, ground by him after the principles he propounded.

Fig. 20.—Dr. Richmond O. Hayes, East Bloomfield, N. Y., was the first to recognize the descent of the condyle and the necessity of placing the models at the proper distance from the joint. He devised an articulator with fixed descending paths and a "facial caliper" for the purpose.

individual case, as the paths are fixed. The principles which he propounded concerning tooth articulation are extremely valuable, and have had a far-reaching effect, not only for their practical value, but for the stimulus given to others to investigate along this line. He did not appreciate the importance of the face bow and stolidly repudiated its worth.

Richmond S. Hayes (Fig. 20), of East Bloomfield, N. Y., about 1887 was the first to recognize the *inclined* movement of the condyle, and the importance of placing the models in the articulator at the proper distance from the joints (Fig. 21). He designed an articulator with fixed descending paths. He also invented an "articulating caliper," the arms of which were placed over the condyles, and by means of a movable joint he obtained the distance, it measuring this one relationship only. The two instruments were designed for combined use and were a great advance. Although he used these with success, he failed in his efforts to have them placed before the profession.

W. E. Walker (Fig. 22), of New Orleans, a member of your society, made known, in 1896, the results of his exhaustive scientific study of condyle movement, and advanced principles that were new and conclusive. He also invented what he chose to call a "dental facial clinometer," for registering the condyle movement, and an articulator which was an improvement on the Bonwill, in that the inclination of the condyle-path could be varied and established independently on either side (Fig. 23). The apparatus, while quite accurate, was so complicated that it did not

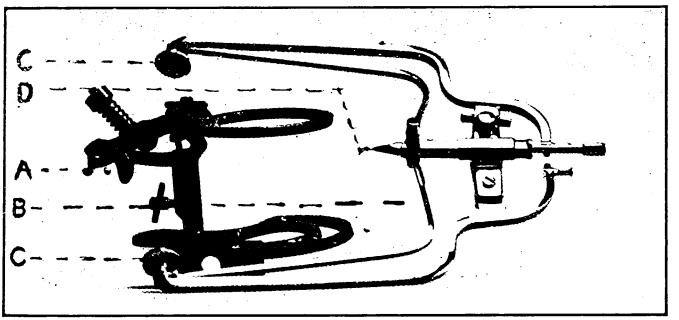


FIG. 21.

Fig. 21.—The Hayes apparatus (a) shows the fixed descending condyle-path; (b) the articulating caliper. The parts (cc) are placed over the condyles; (d) is an adjustable bar the point of which is pressed into the wax rim of the upper trial-plate while in the mouth and the caliper tightened. This will show the exact distance of the front of the models from the joint when adjusted to the articulator.

come into general use. It was deficient in that it did not establish the relations of the occlusal plane to the joints.

Prof. Carl Christensen (Fig. 24), of Copenhagen, about 1901, made a substantial advance, in that he brought out a simple, practical method of ascertaining the inclination of the condyle-paths.

There had, so far, not been a recognition of the importance of establishing the exact relations between the alveolar ridges and the condyles as they exist in the individual case. Dr. Geo. B. Snow (Fig. 25), Professor of Prosthetic Dentistry, University of Buffalo, in 1899 pointed out to the profession this previously unrecognized essential. For the purpose of establishing these relations, he devised the simple and efficient "face bow." This was the most important advance so far made, as no articulator, no matter what its perfection in simulating the movements of the temporomandibular articulation, could give correct results with-

FIG. 22.

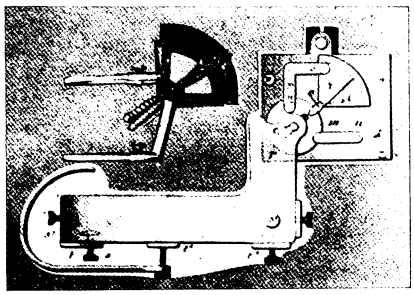


FIG. 23.

Fig. 22.—Dr. W. E. Walker, who invented the "dental facial clinometer" for measuring condyle movement. He also designed the first articulator with adjustable condyle-paths.

Fig. 23.—Dr. Walker's appliances.

out a means by which the anatomic relations of alveolar ridges and condyle might be transferred to it. It has been used with the articulator devised by A. DeWitt Gritman, who was then teaching in the University of Buffalo. This has fixed descending condyle-paths, the pitch having been determined by an average of the measurements of some fifty faces. In 1907 Dr. Snow brought out the New Century Articulator, which differs from the Gritman in having adjustable joint-slides for imitating the condyle movements peculiar to the individual case (Fig. 26).

By the use of the "face bow" in conjunction with the New Century Articulator, models may be set so that the anatomic peculiarities of the temporo-mandibular articulation and the relations of the occlusal planes to the joint are established with sufficient accuracy for all practical purposes. To obviate the necessity of defacing orthodontia models by attaching with plaster, the writer suggested a special support, into which models may be fastened with pointed screws (Fig. 27). While these satisfactorily hold the models, some suggestion for its improvement may soon be made.

The necessary apparatus will be the "face bow" with special mouthpiece, and the New Century Articulator with the special model supports.

Use of Articulator in Orthodontia Treatment.

The technique will be divided into three stages: (1) Making of models. (2) Determining the correct position of the models to the joint. For this the "face bow" is used. (3) Registering the pitch of the condyle-path.

Each stage will now be explained in detail.

(1) The models are made by the means in favor with the individual operator.

FIG. 24.

Fig. 24.—Prof. Carl Christensen, Copenhagen, who thought out a simple and accurate means of measuring the descent of the condyle. He also devised an articulator with adjustable paths similar to that of Walker.

(2) The corect position of the teeth to the joint is determined by the use of the "face bow." The special mouth-piece used for mouths containing the natural teeth is now filled with warmed wax, a small roll of which may also be placed at the anterior of the under side of the tray. This prevents slipping of the lower teeth. This is placed in the mouth so that the projecting stem is in the median line, and the patient is instructed to close. The wax is chilled and the whole removed and laid aside for a few moments. Going to the face, the position of each of the condyles should now be determined and marked upon the cheeks. The movement of the condyle is easily felt when the mouth is opened and closed. The marks are made over the condyles when the teeth are in occlusion, and are usually about fifteen millimeters in front of the external

FIG. 25.

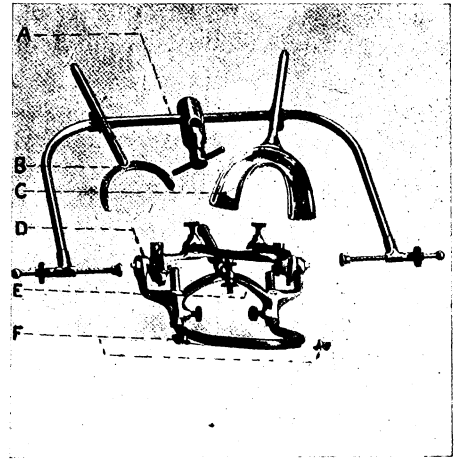


FIG. 26.

Fig. 25.—Dr. George B. Snow and the apparatus of his invention.

Fig. 26.—The Snow apparatus complete to date. (a) The face bow; (b) the mouth-piece for edentulous mouths; (c) the mouth-piece for use when the natural teeth remain, as used for diagnosis in orthodontia; for making interdental splints, etc.; (e) the New Century Articulator with adjustable condyle-path; (d, f), the bite gauges for registering the pitch of the condyle-path.

auditory meatus, and on a level with its floor. The "face bow" will next be adjusted to the width of the face. The condyle ends of the sliding rods are placed over the marks on the face, so that the two sides of the "face bow" are equidistant from the cheeks, and the rods then fastened. The scores on the rods will facilitate centering. The special mouth-piece is now returned to the mouth. The stem of the mouth-piece will project from between the lips. Slip the clamp of the bow over the stem, place the condyle knobs over the marks on the face and tighten the bow clamp securely. Withdraw from the mouth without disturbing the adjustment of the "face bow" (Fig. 28). This is now transferred to the articulator. Push the sliding rods inward as far as they will go, and tighten the controlling clamp-nuts. The sockets in the condyle-knobs will now spring over the condyle-spurs on the articulator joints. Fasten the plaster model of the upper into the bite in the mouth-piece, have the stem of the "face bow" so that it is horizontal, and fasten the model into the articulator by means of the pointed screws. The correct position of the upper model to the joint has thus been established. Now occlude the lower model with the upper and also fasten (Fig. 27).

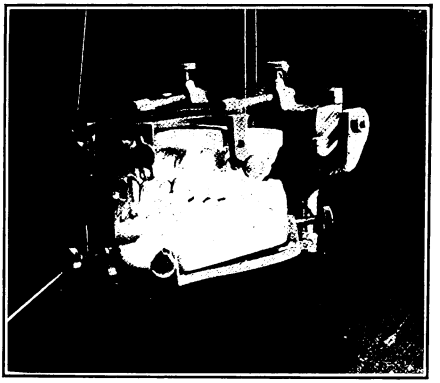


FIG. 27.

Fig. 27.—The New Century Articulator carrying plaster models in special supports to obviate the necessity of attaching with plaster. These are suggested especially for the orthodontist.

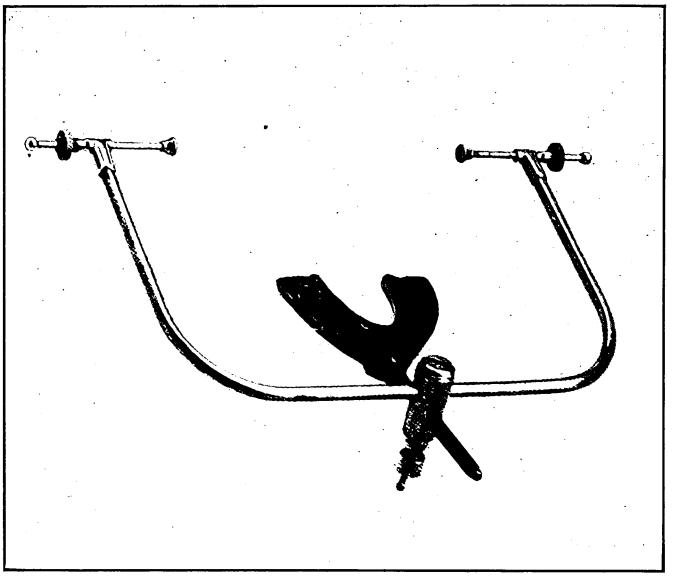


FIG. 28.

Fig. 28.—Face bow removed from the mouth containing the natural teeth with the bite taken.

The pitch of the condyle-path is registered in mouths containing the natural teeth by means of the old-fashioned "squash" bite. The patient is instructed to project the mandible for from three to five millimeters and close into the wax until the teeth meet anteriorly. The posterior teeth will not contact (Fig. 29). The thickness of wax between their occlusal

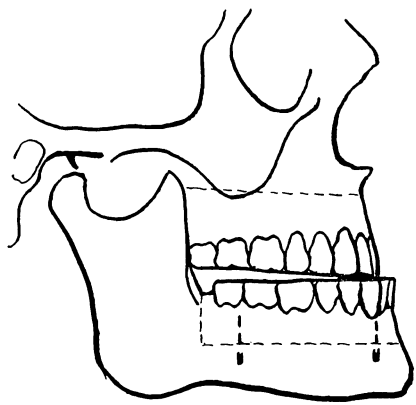


FIG. 29.

Fig. 29—Showing mandible extended. The amount of opening between the molar teeth is determined by the pitch of the condyle-path. The more marked the descent the greater the opening (see Fig. 31c). If the path were horizontal there could be no opening (see Fig. 31b).

surfaces registers the angle of descent of the condyle-path. The wax is well chilled, removed and laid aside for a minute until the articulator is prepared for reproduction of the pitch of the condyle-path. The spring is unhooked, and the gripping-screws of the joint-slides loosened. The "squash" bite is placed in position on the models, which are pressed firmly to place. This automatically moves the articulator condyle-paths into correct pitch. By tightening the gripping-screws this angle is maintained. The spring is hooked and the case is ready for study (Fig. 32).

The *natural* occlusion may now be noted for diagnosis and classification. By oscillating the articulator, peculiarities of tooth contact may be observed as by no other means. The appliances should be planned with the one object of carrying the teeth to such position that normal jaw movement may be carried out with *uniform and undisturbed contact.*

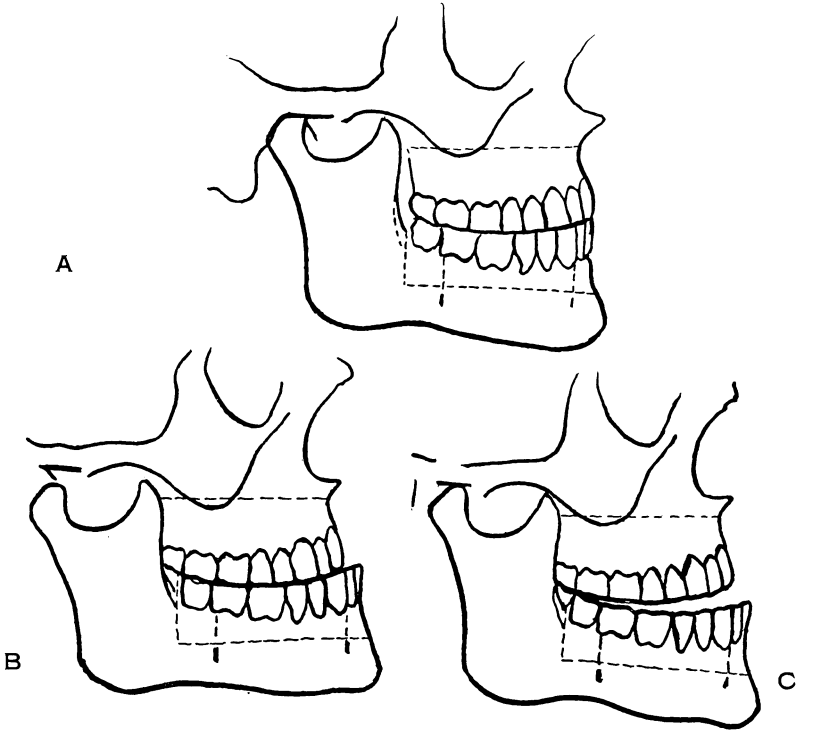


FIG. 30.

Fig. 30—Showing chart having two condyle-paths, the one descending, the other horizontal; (a) represents the mandible at rest, (b) the mandible protruded with the condyle following the descending path. The buccal compensating curve—curve of "Spee"—is in harmony with the angle of descent of the path; therefore, the teeth contact in the bicuspid and molar regions. (c) The mandible protruded with the condyle following the horizontal path, showing the resulting opening in the incisor region.

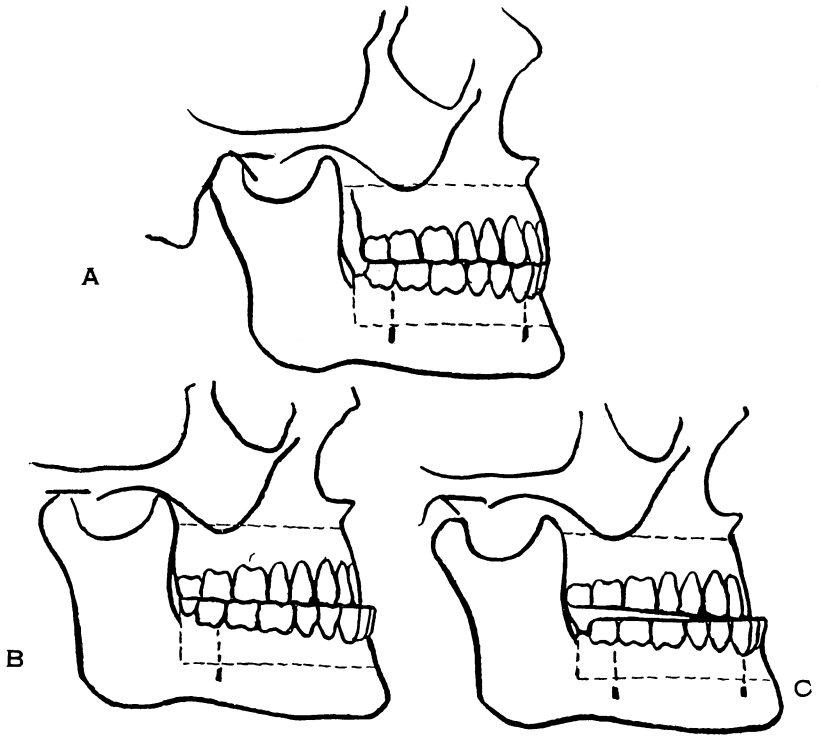


FIG. 31.

Fig. 31—Showing same chart as in Fig. 30, except that the teeth are arranged with no curve. (a) Representing the mandible at rest, (b) the mandible protruded with the condyle following the horizontal path. The teeth are seen to contact in the molar and bicuspid regions, (c) the mendible protruded with the condyle following the descending path, showing the resulting opening in the molar region.

When this is accomplished the writer knows that harmony will result, and it is his belief that many of the discouraging failures in retention will be obviated and results will be obtained which few have recognized and still fewer have experienced.

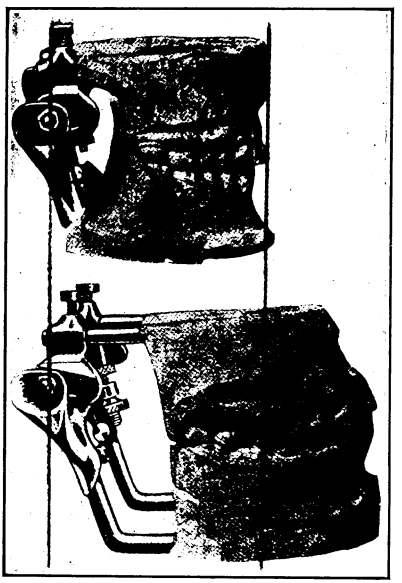
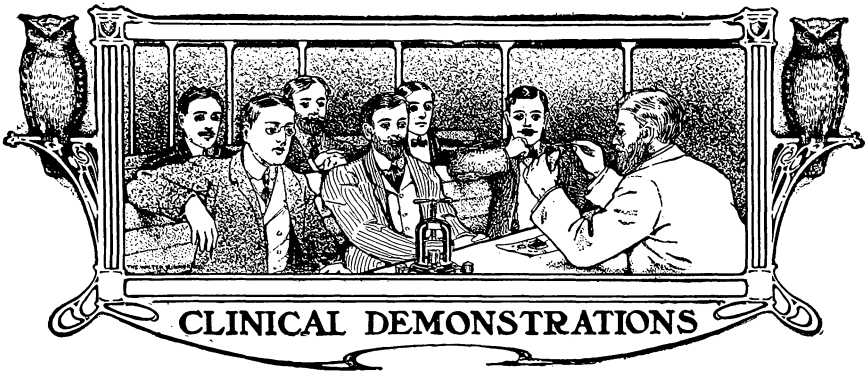


FIG. 32.

Fig. 32.—Two cases mounted with Snow face bow. These will serve to show variance in distance from the joint. Note that the upper central incisors in the one above are on a line with the distobuccal cusp of the upper first molar in the case below.



Clinics before the American Society of Orthodontists.

The Square Buccal Tube*

By F. C. Kemple, D.D.S.
New York

Fig. 1 illustrates the telescoping square tubes which were referred to by Dr. Ottolengui and Dr. Hawley. The technique of adjustment is very simple, and the principle of its application in connection with the "expansion arch" is very broad.

c Shows the buccal tube which, if such a term may be used, has a square "bore" into which the smaller square tube *b* exactly telescopes. *a* shows a small reducer which, used on the engine, strips the thread from the end of the arch and reduces it to exactly fit the opening of the small tube *b*. When the appliance is adjusted, the small tube being soldered to the end of the arch to prevent the arch from turning inside the buccal tube, the tendency is to carry the molars buccally without tipping them. The degree of tipping depends upon the twisting spring of the arch; therefore, to reduce the tipping to the minimum, a large rigid expansion arch may be used.

This principle of establishing a nearly stationary anchorage in expanding the dental arch offers an efficient means of controlling the force employed in a variety of tooth movements. For example, if it is desirable not to disturb the relation of the teeth on one side of the arch and to perform a considerable movement on the opposite side, it may be accomplished by uniting a series of bands and securely cementing them to the teeth, as shown at *c*. (In such an anchorage the buccal tube should be attached at a point that would equalize the resistance of the two ends of the anchorage.) With the regular round tube on the opposite side,

*Shown at Washington, D. C., November, 1908.

and extension spurs on the lingual side of the bicuspids and molar (*f*) force may be applied without fear of disturbing the anchorage at *e*. With the principle of preventing the buccal tube from turning on the arch a range of resistance may be secured in anchorage that enables one to almost perfectly control the force applied.

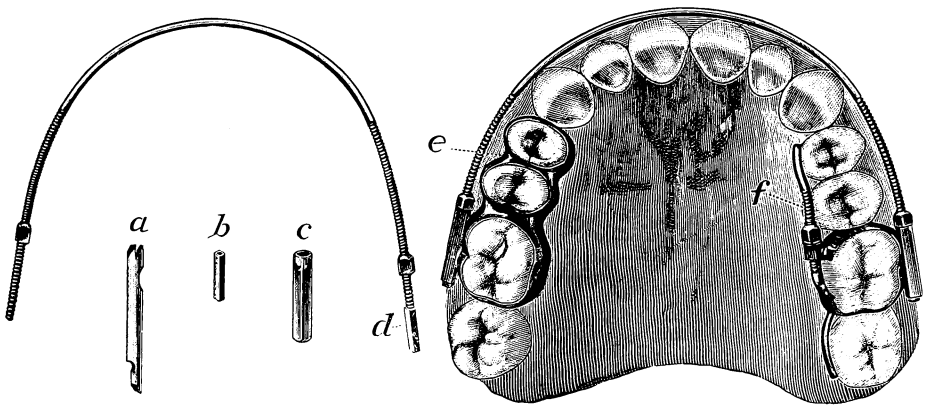


FIG. 1.

Parallel Tube Anchorage Appliance*
Dr. Varney E. Barnes
Cleveland, Ohio

A device to prevent buccal tilting of crowns and to permit or cause root movement, and to increase strength of anchorage.

A. Power tube, with rounded closed distal end to protect cheek, carrying tube nut (B) and soldered to molar or other anchor band.

B. Nut tube screwing into power tube (A) and holding end of threadless arch (D).

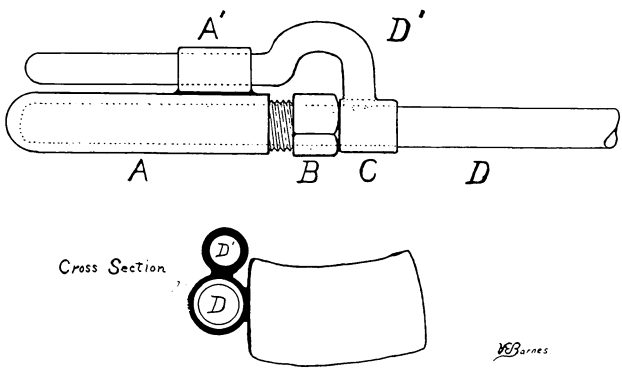
C. Tube closely fitting arch wire (D) and tin soldered to it (D) and hard soldered to wire (D'). This tube is not necessary if the arches are of clasp gold or iridio-platinum, as the wire (D') can then be soldered directly to (D).

D. Threadless arch—usually 16 gauge—may be of any desired metal, and the full strength of wire is at command of operator. (A threaded arch may be used if desired.)

D'. Supplementary wire sliding closely in tube (A') and by its soldered attachment maintained (D) in whatever position desired, providing it keeps a parallel with (D). This wire sliding in its tube prevents

*Shown at Washington, D. C., November, 1908.

tilting or permits of root movement according to its radial relation with (D), and at the same time gives the arch all the advantages of forward movement controlled by a screw. This wire is usually 18-gauge, or may be smaller. The loop is for the manipulation of the nut with a wrench. It will be noted that this loop travels with the head of the nut.



A'. Supplementary tube soldered parallel to tube (A) and as close to gum as is possible. This tube transmits the torsion pressure from D to C to D' to A' to A to B to D, completing the circle and preventing any horizontal or other hinge action.

Method of Shifting Teeth around an Arch.
Dr. Varney E. Barnes.
Cleveland, Ohio

A. Power tube, with rounded and closed end to protect cheek, carrying nut tube C and soldered to band F. (A horizontal hinge attachment.)

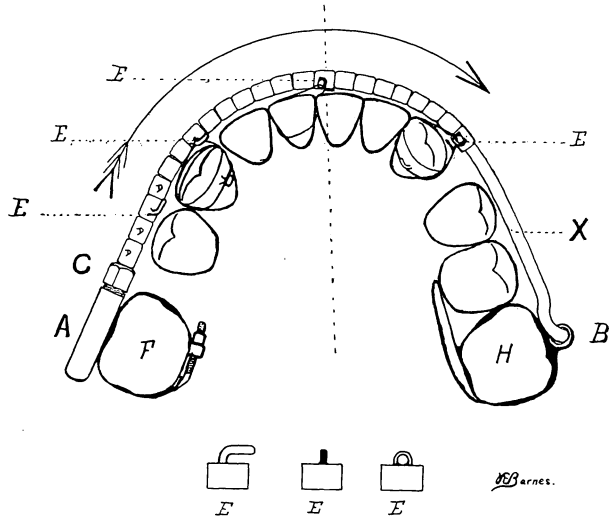
B. Vertical tube attachment (Ainsworth) providing an attachment for end of arch (X) with vertical hinge effect and greater buccal anchorage.

C. Nut tube screwing into power tube (A) and carrying one end of 18-gauge threadless arch (X), which simply slips into the inner threadless tube of the nut.

D. D, D, D, etc., are short sections of tube 1-16 to 3-32 inch long, which fit easily over 18-gauge arch (X). These tubes travel *around the arch* or away from the point of tension which is at the head of nut (C) when the nut is unscrewed out of tube (A).

E. Sections of tubes D, D, D, to which are soldered any kind of attachment desired—in this illustration hooks and rings are used.

F. Screw clamp band with flap. Flap providing means for a closed band in all sizes and preventing washing out of cement and thereby preventing decay where it often occurs with ordinary clamp bands.



H. Plain cemented band with lingual bar to increase anchorage strength. The bands (F) and (H) are shown to outline possibilities in the device. Any type band may be used at either anchorage as the case may demand.

In action ligatures are attached to attachment tubes E, E, E, E, to the teeth to be shifted and the nut (C) is unscrewed, moving tubes D, D, D forward and traveling along the arch with no more than a little friction on that arch. The teeth attached to the tubes, therefore, travel or shift around the arch, or along it at any point desired, depending only on the number of tubes.

Power nut tubes as A-C may be attached at both anchorages and the sliding tubes used to shift cuspids and bicuspids forward in a positive manner and up to the position of incisors which may have previously been moved forward. The incisors may be ligated to the arch, which remains stationary, while the cuspids and bicuspids are brought forward.

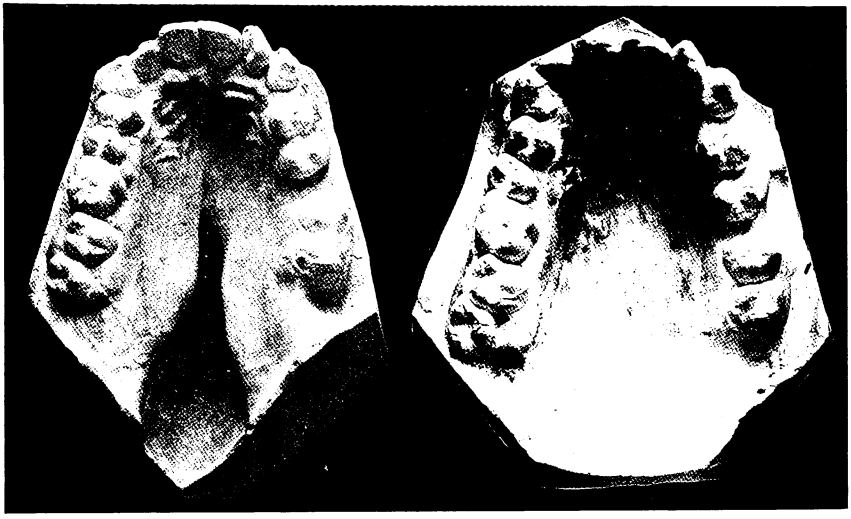


FIG. 1. FIG. 2.

Surgical Treatment of Cleft Palate
By Dr. C. T. Lyons
Jackson, Mich.

The subject of clinic was "Surgical Treatment of Cleft Palate." Exhibited models before and after treatment, also exhibited patient who had been operated on.

Age of patient, 27.

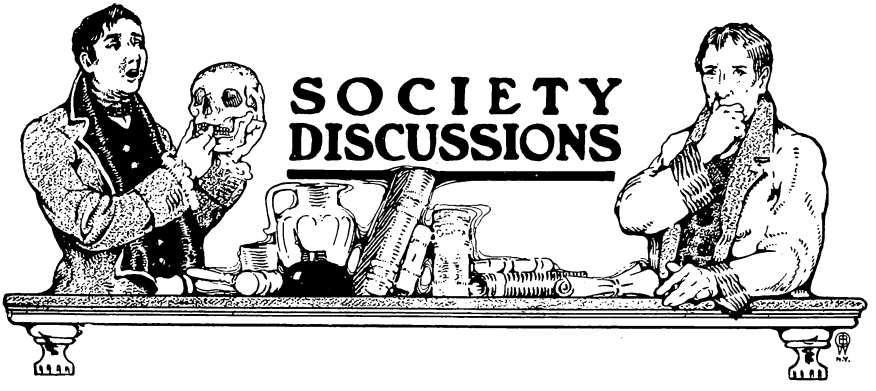
Cleft of soft palate.

Fig. 1 shows model of mouth of patient before operating.

Fig. 2 shows model of mouth four weeks after operating.

Before the operation patient could not pronounce her own name distinctly as her name has the letter "k" in it, involving the sound of hard "g" as in "girl," "give," etc. This sound is a difficult one for one affected with cleft palate to pronounce.

This operation was performed several weeks before the meeting and the patient was able to read and talk plainly, pronouncing her own name as distinctly as anyone.



Second District Dental Society.

A regular meeting of the Second District Dental Society of the State of New York was held on Monday evening, November 8, 1909, at the Kings County Medical Association Library Building, No. 1313 Bedford Avenue, Brooklyn, N. Y.

The President, Dr. F. T. Van Woert, occupied the chair and called the meeting to order.

The Secretary read the minutes of the last meeting, which were approved.

Dr. Gough, on behalf of the Committee appointed to consider the President's Address, stated that the Committee favored the adoption of the recommendations in such address, which are as follows:

First, that whenever practicable, all papers be preceded by a clinic.

Second, that a committee be appointed to confer with the other societies in this locality, for the purpose of establishing a fund for old and needy members of the profession.

Third, that Section 1, of Article V, of the the By-Laws be amended by etriking out paragraph 3 thereof, which provides for the reading of an annual address by the president.

On motion, the report was adopted.

Dr. Gough then moved that the President appoint a committee to confer with committees from the other societies of Greater New York, looking toward the formation of a fund for the purpose set forth in the President's Address.

The motion was carried.

The paper of the evening, entitled "A Place for More Art in Dental Prosthesis" was read by Dr. James P. Ruyl.

Discussion of Paper by Dr. Ruyl.

Dr. Chayes
New York.

You have invited me to discuss the paper of the evening, and hesitatingly I have accepted the call; hesitatingly, not because of lack of appreciation of the honor conferred (an honor all the greater because one of your own prominent members is the distinguished Professor of Prosthetic Dentistry at the New York College of Dentistry) and not because I am unaware of the great void of artistic development of dental skill; rather, because the very name of his paper opens up a field heretofore so barren of effort and so lone in its virginity, that the task of intelligent, lucid and results-producing discussion becomes at once protracted and arduous.

There is no doubt, Mr. President, that the title of this evening's paper opens up avenues of thought heretofore but unwillingly explored by the mind of man, and calls into life and activity many dormant ideals of ours, and were it not that the time you gave me for preparation was so short and inadequate, I might have appeared here before you to-night with a volume or two written in behalf of this timely plea; needless to say, you are all duly grateful for their absence.

I unhesitatingly grant the essayist's contention as to the absolute and lamentable lack of artistic development in prosthetic dentistry, and I ungrudgingly and fervently send my prayer and plea, with his, into the willing and unwilling ears of my fellow practitioners, but I am not of a mind to let pass this lack of art with the simple nod of recognition. I am not of a mind to allow this great, grewsome, deplorable and noxious void in prosthetic dentistry to be robbed of its demoralizing importance and profession-deteriorating influence by discussing various and varying methods of work construction. That has time and we will come to it in season.

I want to delve deeply and thoroughly in to the why and wherefore of this general absence of art in our profession, and I mean to do it before this meeting comes to a close.

The essayist, so deeply interested in this question, will pardon me for the only seeming digression from his paper, and you, Mr. President and gentlemen, will bear with me indulgently I hope, so that we may be permitted to take up this important topic from its present status and retrace our steps along the labyrinth of its development and growth; and thus we shall be in a position to intelligently discuss the ways and means by which we may hope to bring about a change for the better.

Let it be said to start with that the lack of artistic development in prosthetic dentistry is no greater to-day that it ever has been. It is more apparent for the reason that our esthetic sense, our appreciation and

desire for the harmonious and the beautiful have grown in an inverse ratio to the attempt of any school to properly prepare the student in the art department of the dental curriculum; in other words, the greater our longing for art, the greater our desire for harmonious results, the less adequate seem and actually are those departments in our colleges which would and should tend to satisfy and enhance our propensities in that direction.

It is a fact, is it not? That here are some of us who are willing to spend and do spend restless days and feverish nights at our work-benches and in our libraries in the attempt to evolve better things than the ones we have been taught in our schools and colleges during the period of study.

It is a fact that some of us work away unceasingly with feverish fingers and hair-trigger brain actions, lips parched with the fever excitement at discovery, and eyes dilated in anticipation of results often disappointing.

It is a fact that some of us are often oblivious to our surroundings, even to the extent of not earning enough to liquidate our monthly bills.

It is a fact, too, that some of us gaze fondly and lovingly at some piece of work completed and seemingly perfect; some of us do feel a thrill of joy, the joy of achievement, and a dart of agony at the thought of parting with the child of our ideals and the results of our handiwork.

There are then some in our profession in whom the artistic development and artisan's skill have kept pace with the growth of their esthetic sense.

That is one side of our profession, gentlemen, the bright side, the hopeful side, the redeeming side—but not the commercial side. We shall have another view directly if you are patient.

It is a fact that there are some men in the ranks of our profession to whom nothing is sacred. They take the science, the art, the fine art and the useful art and make commerce out of it, with the sole purpose of mammonizing what they have been taught. It is a fact that we have our Painless Parkers, our commercial Cadys, Hubbardized and eulogized for lucre. It is a fact that we have in our profession men (if they can be called such) who live and prosper on the prostitution of all that some of us hold dearer than life, the sanctity of our profession. And yet these men, who, according to our judgment, have gone astray, once started from the same point of undeveloped mentality, from the same point of professional incompetence, where we originally began. They too attended schools and colleges and were apparently ready and willing to imbibe the knowledge that was offered.

What has caused these men to ignore all that is inspiring, all that is

real and all that is worth while in the profession, for the mere commerce of it? Clearly something was at fault, something went awry. It is the one and only conclusion possible. The student and the institution are here. If the student is not of the right sort of material, why take him at all, any more than the true artist would attempt to play upon an apology for an instrument; any more than a true sculptor would attempt to create a marble bust out of common clay. If the institution be incapable of determining the right or wrong sort—why have such an institution? And if they do determine the student to be the wrong sort, and yet take him, the crime of the institution then becomes twofold.

Other things being equal, men would rather do what is right than what is wrong; but other things are not always equal; in fact, what we shall for the present term "other things" are very rarely equal, and so men travel along the line of least resistance and *spiritually* they perish.

The exhibition of any artistic tendency by any human being implies the possession of certain ideals, for, mark you, *"Art is merely an external manifestation of our ideals, the revelation of the invisible reality through the senses."* It is the work of the whole spirit of man as distinguished from manufacture, which is the result of handiwork only. It is the embodiment of beautiful thought in sensuous form (marble or speech).

We have the esthetic or fine arts, or the arts of beauty; and the useful, or industrial, arts. The fine arts call for the exercise of taste and imagination and furnish the sphere of the true artist.

They may be classified as follows:

The fine arts, whose object it is to create form for its own sake, embracing painting, engraving, sculpture, music and poetry.

The dependent arts, whose object it is to create form that shall minister to some utility, embracing architecture, decoration, landscape gardening, ceramics, glass-making, and other applications of the principles of artistic construction.

The useful arts include the trades, which require chiefly manual labor or skill and which engage the ingenuity of the artisan.

You will have to rest content with the foregoing brief definition of art, *and for the purpose of lucid conclusion I must again repeat that art is the external manifestation of our ideals in the substitution of natural objects and in the portrayal of natural phenomena.* The very manifestation of such ideals implies also the existence of what, for want of a better term, may be called the true artistic sense, and the artistic sense is that part of our neuro-psychological make-up which tends to create within us a love for all that is beautiful.

The logical conclusion which one must reach is that the reason for the lack of artistic development in dentistry ils caused:

First—By the fact that the student of dentistry does not obtain a sufficient ground knowledge of the profession during his period of study at school or college, because,

(*a*) The relation between present institutions and their students is one of commerce; the institution has something to sell and the student has the wherewith to buy it, and the greater the number of students, regardless of their fitness for dentistry, the greater the commercial gain of the institution.

(*b*) There is so much to be conveyed and so much to be learned in the study of dentistry, that the three-year course is absolutely inadequate for the proper appreciation and assimilation of it by the student.

Second—The general student gaining admission to the schools, does not possess an artistic sense which would tend to generate and call forth the highest ideals, and should be rejected by the dental colleges as unfit for the study of dentistry.

Third—Those who do possess the necessary qualifications should be encouraged and instructed along lines which will induce these ideals to manifest themselves in their work.

Fourth—There is no dental college in existence to-day, to my knowledge, where the student meets any spirit or obtains any training which might by virtue of constant action upon the receptive student mind tend to imbue him with a love for the beautiful.

Fifth—There exists no environment in the dental college of to-day which would tend to produce the proper culture of mind and spirit so essential to the making of the true artist in his chosen profession.

Sixth—Quite to the contrary, there exists in these institutions an atmosphere altogether so commercial in theory and in fact, that the student, though he be possessed of certain ideals when he enters, soon becomes permeated with the same spirit of "Belittle, Barter and Buy" that seems to prevail in every nook and corner of what is to become his Alma Mater.

The sooner the colleges recognize the foregoing and rectify the fault, the sooner will they do their full measure of justice to the minds entrusted to their care for proper training and development.

No man who truly loves his work will stop short of perfection in it. No man who sincerely seeks perfection in his work will ever dream of prostituting his profession, and any student carefully chosen for his propensities in that direction, by an institution in which ideal fitness and professional efficiency mean everything, and to which the spirit of commerce and the longing for mammon are as foreign as *Vita in Vacuo!* I say any student chosen by and instructed in such an institution can be

depended upon to strive for perfection and to take for his motto:—"The results of all efforts of man should be his efforts at greater results." And so we have by virtue of all the foregoing arrived at a point where we may truthfully say: "If any young man enters a professional school or college and comes forth therefrom a professional parasite, a Hubbardized Cady or a Gordon-Martinette, something or everything is lacking in that school.

And the remedy. The absolute eradication of the evils cited above, even if it involve the eradication of dental institutions of the mammonical type and the creation of an institution which would offer a course broad enough, long enough and thorough enough to equip the student properly in every direction for the practice of the *science and the art* of dentistry.

Less students and better; closer, more personal attention to them; more culture, more refinement of surroundings; more training in the esthetic arts; a higher standard of requirements in academic education and a careful attention to imbuing the mind of the student with a love for his work. Obtain these and you will be surprised how rapidly this void will be filled; you will be surprised to see first the student and then your fellow practitioner strive for perfection in their work and introspection will make none of us blush for ourselves or our seats of learning.

Dr. Hillyer. I feel as though I had heard two papers to-night, and it seems to me that must be the impression of everyone here. The first paper was a practical one, and the second dealt more with the ethical side of the question. It is a little difficult to know how to discuss both at the same time. I almost wish the second had come first, with all due respect to Dr. Ruyl, and that the practical side had come second, because it seems almost impossible to discuss it in any other way.

In three years of college life, with the comparatively short time, so to speak—if you compare it in actual hours—that is given up to this work, both didactically and clinically, I wonder sometimes that we get even the results that we do. We are fighting constantly for time to present this work and get the proper attention for it—fighting against the other departments that demand time for their work. When a man graduates he is just in a position to branch out. I think it is about three or four years since Dr. Goslee presented a paper before this society, in which he deplored the retrograde position of prosthetic dentistry, and he put all the dark sides forward. Meeting him directly afterwards, and again a few days later at a meeting of the Pedagogic Institute, he confessed he had put the darkest side forward without intending to appear pessimistic.

I do not think that prosthetic dentistry to-day is any worse off, as far as its practice is concerned, than it was years ago. I think specimens as they appear from time to time will prove that. If the percentage of

practitioners to-day were placed in comparison with the percentage of good and bad practitioners of years ago, there would be a good showing in favor of to-day. The numbers are so much greater that it would be hard to compare them; but there are beautiful workers to-day, and on the other hand, there are not so many pieces of a certain kind to-day, as, for instance, full and partial dentures; development is more along the line of bridgework.

I never regretted anything so much as I regretted the giving up of the fourth year, when it was once established; for with that fourth year it would have been possible to have men practice and do nothing but practice, and they would have been better prepared when graduated.

As far as individual cases are concerned, Dr. Ruyl is to be complimented highly for the specimens he has shown; they are simply indicative of what can be done. I think what has brought about more than anything else this work, has been the idea that has prevailed in regard to proper occlusion; and if proper occlusion is sought, even in restoration by artificial work, the results will be better. The idea of filling a space with a large tooth merely because a space exists there, is not at all essential, and it would be better to have a space than a too large tooth.

Dr. Ruyl spoke of filling up the gum margin with the gum enamel. That is good many times, but sometimes it is not, where there is denuding of the roots for example, and where it is a simple matter to take an ordinary tooth where there would be a long plain porcelain facing, and by grinding simulate a denuded root. This does not require any staining to give it a good appearance—for the very fact of having taken off the gloss in giving it the contour causes the secretions to give it the same appearance as the natural tooth would have assumed.

It would be hard to go into the points in detail. Were those blocks exhibited carved from porcelain entire, Dr. Ruyl?

Dr. Ruyl. Yes.

Dr. Hillyer. That is certainly a most beautiful conception of work—as fine as I have seen any carved blocks for some time, and I heartily congratulate the Doctor on the work he has shown.

Dr. Babcock. I shall not attempt to eulogize the paper, because it needs no eulogy. I merely want to bring out a couple of practical points. Often in inserting a case we find the teeth stained, and there you will find the staining methods very valuable.

Dr. Ruyl spoke of preparing the band and then the cusp portion, and uniting them with gold—filling in afterwards. If you use a tooth like that as a support for a bridge and you must apply much heat, there is a

tendency to draw the solder from the cusps. I would suggest that before uniting the cusp portion to the band it is well to invert it and melt a little 18-carat gold in the cusps.

Dr. Ruyl speaks of using the gum sections for filling in, where there has been absorption. That is good in a piece that can be removed; but when you put it in a fixed piece, I question whether it is the best plan, and personally I should hesitate very much to do that, because I know the average patient would not have a sweet breath after such a block had been in for a short time.

Dr. Hellman. I wish to emphasize a point, and that is, the artistic portion which is often very much forgotten in the preparation of an abutment. That is where a good many crowns and bridges have failed. The abutment at the gingival border should fit well and either allow the gum to cover it, or, if that seems undesirable, there should be a good cleansing space.

Dr. Ruyl. I do not know that there is much to say in closing. I wish I could have seen Dr. Chayes first; if we could have combined our papers, I am sure I would have had a better paper. He was able to express his artistic ideas, which I did not have the chance to do. I am only sorry that I was not able to express myself as he did. I want to thank him for helping me out.

In reference to Dr. Babcock, he speaks of a bridge where if you would span the space and put in the gum block, it would not be as sanitary or as clean as another kind of bridge. I think he meant probably the sanitary bridge with the opening underneath.

Dr. Babcock. No, sir; that kind may be used, but that is not the kind I use. Personally I believe in using the plain tooth, fitting it up to the plaster cast, trimming out on the plaster so there is a slight contact on the mucous membrane. The block section, as I understand it, fills the entire space, so that there is no chance for clearance at all, and I think that would be troublesome.

Dr. Ruyl. I think if the patient is clean, there would be no difficulty in keeping such a piece sanitary, any more than where the teeth are against the gum. The only reason the gum block was recommended, was to make a more harmonious appearance in the mouth, and have the cervical margin of the artificial tooth on a line with the natural tooth.

Adjournment.

EDITORIAL

Two Notable Banquets.

A number of years ago Dr. Norman W. Kingsley conceived and managed a very successful function which he termed "The Dinner to the Patriarchs." There were a number of guests of honor, all of whom were invited because of long and faithful services as dentists.

Since that time numerous others have been similarly feted, some anniversary serving as the excuse, as for example, the thirtieth, fortieth, or fiftieth year of practice. Such dinners are always pleasant, and the custom should be encouraged. It is a satisfaction to know that men may practice for thirty, forty, or fifty years in a community, and still retain the good will and good fellowship of their professional brethren.

But a somewhat different function has gradually come into existence. Five annual banquets have now been given in New York City with a single guest of honor sitting beside the toastmaster. At the banquet at the Waldorf-Astoria Hotel on Saturday, January 22, the guest was Prof. James Truman, a name which is symbolic of the highest in dental practice, dental teaching and dental journalism. It was stated that Dr. Truman was eighty-four years of age, but it seemed impossible to believe

this, so virile was his appearance and so magnificent and magnetic the voice with which he rendered the best speech of the night.

More than two hundred were present, this being the record attendance thus far, at the New York banquet. No guest has been named as yet for next year, but there is no doubt that this banquet will be continued as an annual feature of dental professional life in the Metropolis.

One week later, Saturday, January 29, the Odontographic Society of Chicago concluded one of its most successful "big" meetings by tendering a complimentary banquet to Prof. Greene Vardiman Black in the ballroom of the Congress Hotel. This was another inspiring occasion, four hundred men from the North, East, South and West sitting at the feet of the master.

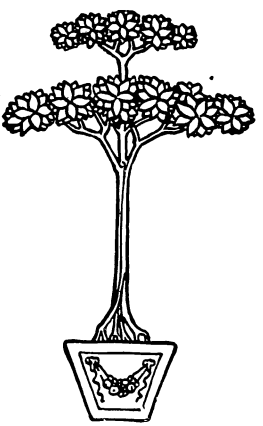
Dr. Gilmer was the first of the after-dinner speakers, and he surprised all by being able to entertain them for over one hour. His discourse was largely of the life and work of his friend, the guest, illustrating his talk with really beautiful lantern-slides made and shown by Dr. Noyes. All of these were delightfully attractive, giving as they did sidelights on the life of Professor Black which have been known to but few. Professor Black as a fisherman; as a boatman; as a sailorman; in camp and cooking his own victuals; his old homestead; himself at work; his worktable! These and many others proved an interesting novelty at an after-dinner talk.

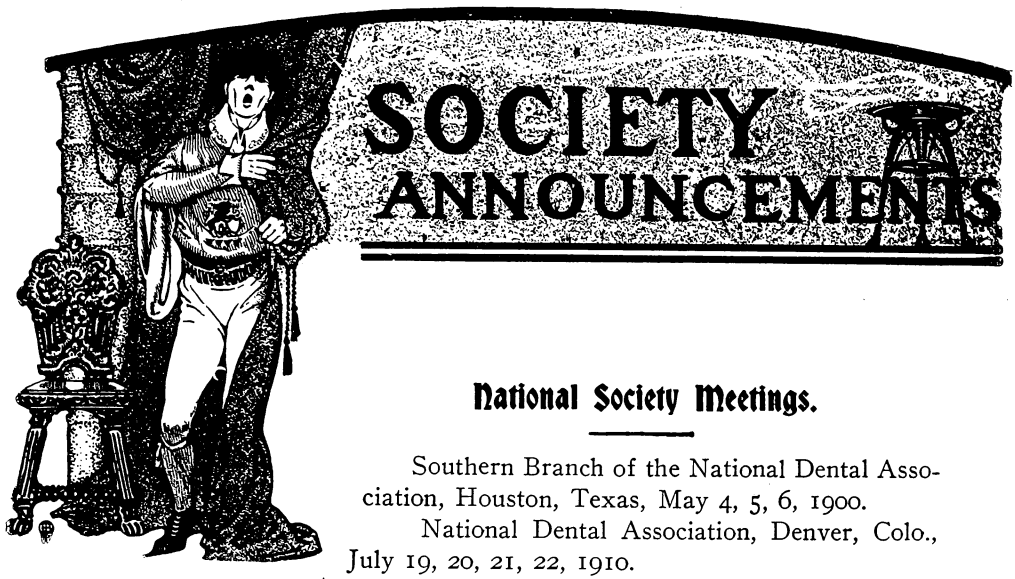
The last-mentioned, Professor Black's worktable, is reproduced in this number. To the writer it suggested a great moral lesson. Will the reader of these lines turn to the picture. See! It is but a wooden chair, and a wooden table. Just a deal-table, but oh! what a deal of work has been done at that table. And such work!

Gazing at that picture, as it remained on the screen at the banquet, the writer drew a mental picture of quite a different sort. In it the chair is of plush, and the table is covered with green cloth, and ivory balls are rolling from side to side. How many, oh, how many dentists have spent their evenings at this sort of table, while Professor Black sat in this wooden chair, with his eye to the end of a microscope, or his hands busy with retorts and crucibles studying out problems, the solutions of which have lightened the labors of them and thousands of his confreres.

Then, as both pictures faded, and the electric lights again illumined

the banquet hall, it was pleasant to know that at least four hundred men had turned aside from the billiard-ball and cue, from golf and tennis, fishing, hunting and other pleasures, to honor the man whose pastime for nearly half a century has been the serving of others. And looking at the Guest of Honor it was more than gratifying to observe, that in spite of his whitening hair, Professor Black seems yet to be but in his prime. He said to those present: "I am not ready to stop yet!" And so we may say to him: "God speed to you in your work, Professor Black!"





National Society Meetings.

Southern Branch of the National Dental Association, Houston, Texas, May 4, 5, 6, 1900.

National Dental Association, Denver, Colo., July 19, 20, 21, 22, 1910.

National Association Dental Examiners, Denver, Colo., July 25, 1910.

American Society of Orthodontists, Denver, Colo., July 13, 14, 15, 1910.

State Society Meetings.

Alabama Dental Association, Mobile, Ala., May 10, 1910.

California State Dental Association, San Francisco, Cal., June 27, 28, 29, 1910.

Connecticut State Dental Association, New Haven, Conn., April 19, 20, 1910.

Illinois State Dental Society, Springfield, Ill., May 10, 11, 12, 13, 1910.

Indiana State Dental Association, Indianapolis, Ind., May 17, 18, 19, 1910.

Iowa State Dental Society, Des Moines, Ia., May 3, 4, 5, 1910.

Maine Dental Society, Rangeley, Me., June 22, 23, 24, 1910.

Massachusetts Dental Society, Springfield, Mass., June 8, 9, 10, 1910.

Mississippi Dental Association, Jackson, Miss., May 24, 25, 26, 1910.

Missouri State Dental Association, St. Louis, Mo., May 24-27, 1910.

Montana State Dental Society, Great Falls, Mont., May 6, 7, 1910.

Nebraska State Dental Society, Omaha, Neb., May 17, 18, 19, 1910.

New York State Dental Society, Albany, N. Y., May 5, 6, 7, 1910.

Pennsylvania State Dental Society, Harrisburg, June 28, 29, 30, 1910.

Kansas State Dental Association, Topeka, Kansas, May 17, 18, 19, 1910.

Kentucky State Dental Association, Louisville, Ky., May 26, 27, 28, 1910.

Louisiana State Dental Soceity, New Orleans, La., May 9, 10, 11, 1910.

Texas State Dental Association, Houston, Texas, May 3, 1910.

Vermont and New Hampshire Dental Societies, Rutland, Vt., May 17, 18, 19, 20, 1910.

Virginia State Dental Association, Staunton, Va., July 20, 21, 22, 1910.

Wisconsin State Dental Society, Ashland, Wis., July 12, 13, 14, 1910.

West Virginia State Dental Society, Parkersburg, W. Va., Oct. 12, 13, 14, 1910.

National Dental Association.

Fourteenth Annual Session, Denver, Colo., July 19 to 22, 1910.

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*Term expires.

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THE CHAIRMEN OF SUB-COMMITTEES—Publicity, H. F. Hoffman, 612 California Building, Denver, Colo.; Clinic, A. W. Starbuck, Halsh Building, 14th and Arapahoe, Denver, Colo.; Exhibits, John Steele, 632 Empire Building Denver, Colo.; Entertainment, I. C. Brownile, 404 California Building, Denver, Colo.; Hotel, ——.

National Association of Dental Examiners.

The twenty-eighth annual session of the National Association of Dental Examiners will be held at the new Hotel Savoy, Denver, Colo., beginning Monday, July 25, at 10 A. M. The rates will be $2 per day for one and $3 per day for two persons in room, European plan. Large room for one or two, private bath, $4 and $5 per day. Meeting and committee rooms at the service of the association free, and every accom-

modation extended. An early reservation by mail is requested, the time being the busy season. A full representation from every State in the United States is earnestly desired.

CHARLES A. MEEKER, D.D.S., Secretary,
29 Fulton St., Newark, N. J.

J. J. WRIGHT, D.D.S., President,
Wells Bldg., Milwaukee, Wis.

Fifth International Dental Congress.

All colleagues who have taken part in the Fifth International Dental Congress and who have not received the supplement of the Congress Paper, which had been sent to the members some time ago, are requested to send their names and exact address, as well as the number of their Congress card to the Secretary of the Fifth International Dental Congress, Dr. med. Konrad Cohn, Berlin W. 35, Potsdamerstr. 46. This only will enable us to publish an exact list of all the visitors at the Congress, and to send to the members the prints which have been published up to the present. A great number of letters has been returned, the addresses having been indicated incompletely.

Illinois State Dental Society.

The forty-sixth annual meeting of the Illinois State Dental Society will be held in Springfield May 17, 18, 19, 20, 1910. In addition to an especially good list of essays and clinics, an unusually attractive supply exhibit is being planned.

J. F. F. WALTZ, Secretary.

Decatur, Illinois.

Connecticut State Dental Association.

The forty-sixth annual convention of the Connecticut State Dental Association will be held in this city at Warner Hall, 1044 Chapel Street, on Tuesday and Wednesday, April 19th and 20th, 1910.

The officers and committees are putting forth every effort to make this the largest and most interesting meeting ever held in the State.

E. R. BRYANT, Chairman.

New Haven, Conn.

Canadian and Ontario Dental Associations.

Canadian Dental Association and Ontario Dental Society, combined convention, Toronto, Canada, May 31, June 1, 2 and 3, 1910.

Southern Minnesota Dental Society.

The twenty-fifth annual meeting of the Southern Minnesota Dental Society will be held at the Saulpaugh Hotel, Mankato, Minn., April 11, 12 and 13, 1910. C. A. HINTZ, Secretary.

Springfield, Minn.

Lake Erie Dental Association.

The forty-seventh annual meeting of the Lake Erie Dental Association will be held at Hotel Rider, Cambridge Springs, Pa., May 17, 18 and 19, 1910. All reputable practitioners are cordially invited to attend.

Warren, Pa. V. H. MCALPIN, Secretary.

The Alumni Association of the Kansas City Dental College.

The annual clinic of the Alumni Association of the Kansas City Dental College will be held at the new College Buildings, Friday and Saturday, February 18 and 19, 1910.

While this clinic is under the auspices of the Alumni Association we cordially invite the cooperation of all ethical dentists.

The program will consist of chair and table clinics of unusual merit where best methods and latest appliances will be demonstrated.

A. E. GOSSARD, President.
A. C. GARDNER, Secretary.

Alumni Association of the College of Dentistry, University of Illinois.

The Alumni Association of the College of Dentistry, University of Illinois, will hold their third annual clinic and meeting in the College Building, corner of Harrison and Honore Streets, Chicago, on Wednesday, June 1, 1910 This will be a strictly alumni clinic, but a hearty invitation is extended to ethical members of the profession to attend.

FRANK J. RYAN, Secretary.

Eastern Indiana Dental Association.

The Eastern Indiana Dental Association will hold its thirty-ninth annual meeting at Cambridge City, Ind., April 12, 13, 1910. President, Dr. Charles Kneise, Cambridge City, Ind.; Vice-President, Dr. C. C. Miller, Plainfield, Ind.; Secretary and Treasurer, Dr. A. O. Martin, Richmond, Ind. Executive Committee: Dr. W. B. Harris, Cambridge City, Ind.; Supt. of Clinics, Dr. R. C. Leslie, Cambridge City, Ind.; A. O. Martin, Secretary.

Kentucky State Dental Association.

The forty-first annual meeting of the Kentucky State Dental Association will be held in Louisville, May 26, 27, 28, 1910.

An unusually interesting and profitable programme is being arranged for this year, and a cordial invitation is extended to all ethical members of the profession. W. M. RANDALL, Secretary.

Corner Brook and Broadway, Louisville, Ky.

The Annual Meeting of the Alumni Dental Association.

The annual meeting of the Alumni Dental Association of the State University of Iowa will be held at Iowa City on the 8th and 9th of March, 1910. All ethical practitioners, whether Alumni of the Dental Department of the State University or not, are urged to be present. "Come, let us reason together."

DR. H. H. GARDNER, Secretary.

Williamsburg, Iowa.

Texas State Board of Dental Examiners.

The regular meeting of the Texas State Board of Dental Examiners will be held in Houston, Texas, beginning 9 A. M., Monday, June 13, 1910. Diplomas not recognized or registered. Examination required of all. No interchange of license with any other State. No special examination to practitioners already in active practice. Applications, accompanied by a fee of 25, should be in the secretary's hands June 10.

For fuller information, address BUSH JONES, Secretary.

Dallas, Texas.

Minnesota State Board of Dental Examiners.

The next regular meeting of the Minnesota State Board of Dental Examiners will be held at the Dental Department of the State University in Minneapolis on March 15, 16 and 17, 1910.

All applications must be in the hands of the Secretary ten days before. All applicants must be graduates and present their diplomas. Those having practiced in any of the following States for five years or more will be exempt from the theoretical examination: Iowa, Indiana, Michigan, Nebraska, Wisconsin or Montana. Minnesota dentists are admitted to those States on same conditions.

For blanks and further information apply to

DR. GEO. S. TODD, Secretary.

Lake City, Minn.

New Jersey State Board of Registration and Examination in Dentistry.

The New Jersey State Board of Registration and Examination in Dentistry will hold their semi-annual examination in the Assembly Chamber of the State House at Trenton, N. J., July 5, 6 and 7, 1910.

Practical work on the 5th, and the theoretical examination the 6th and 7th. All applications must be in the hands of the Secretary ten days prior to the meeting. Applicants must send preliminary credentials and photograph with the application or it will not be accepted.

Sessions begin promptly at 8 A. M. each day.

CHARLES A. MEEKER, D.D.S.

29 Fulton St., Newark, N. J.

Michigan State Board of Dental Examiners.

The next regular meeting of the Michigan State Board of Dental Examiners for the examination of applicants for registration will be held at Ann Arbor, beginning Monday, June 20th and continuing through the 25th. Applications must be in the hands of the secretary at least fourteen days before the examination, and should be addressed to

A. W. HAIDLE, Secretary-Treasurer.

Negaunee, Mich.

Dinner to Dr. D. O. M. Le Cron.

On January 18th a dinner was given in St. Louis at the Hotel Jefferson in honor of Dr. D. O. M. LeCron, by the St. Louis Society of Dental Science.

Dr. LeCron was presented with a beautiful loving cup as a token of the love and esteem of his fellow practitioners, and to show their appreciation of the great service he has rendered to them and to his profession at large by the numberless experiments and excursions which he has made into the field of original research, that have contributed so largely to the present high efficiency of dental practice.

J. P. MARSHALL, Secretary.

New Dental Clinic.

Appeal to the Young Practitioners of Dentistry:

A Dental Clinic has been organized at the Vanderbilt Clinic, College of Physicians and Surgeons, Columbia University, Sixtieth Street and Tenth Avenue, Manhattan, and is attached to the surgical department of the clinic, being supervised by the Clinical Chief in Surgery.

Under the dentists' care come all cases of dental and oral diseases. He has at his command the advice of physician and surgeon. He has recourse to the pathological, chemical and X-ray laboratories to assist him in diagnosing doubtful and difficult cases. Here he has indeed an excellent opportunity for perfecting himself in dental practice and oral diseases, an opportunity of which very many should and must take advantage.

The young graduate of medicine does not deem himself competent to treat the sick, and seeks to perfect himself by hospital and clinic practice. He, the young physician, realizes also the claim upon his professional services by the poor, and he gives to them freely and generously.

Dentistry as a sister profession has need of more generally realizing that its beginners are equally in need of clinical practice, in order to perfect themselves in their work, that they too must give generously of their services to the deserving poor. Too many of us regard dentistry as a luxury, and something that can be done without, unless the patient can afford to pay. An aching tooth, an endentulous mouth, a fractured jaw, or an antral empyema may hardly be termed luxuries, and the treatment for these ills is just as important and necessary as the treatment of any disease of the human body. Dentistry is not a luxury, no more than general surgery.

Let this communication be as an appeal to the young element in dentistry. There is a twofold claim on us. First, the need we have of perfecting ourselves in the treatment of oral and dental diseases; and, second, the debt that every professional man owes to the poor of the community. We have yet to show that dental free clinics are a success. Let as many volunteer their services for two, three or four hours a week as possible.

Applications for position of assistant visiting dentist may be sent to the Dental Department, Vanderbilt Clinic, Sixtieth Street and Tenth Ave., or by calling personally, Tuesday, Wednesday and Friday mornings.

Respectfully,

DAVID WURZEL.

Odontological Society of New Orleans.

At the annual meeting of the Odontological Society of New Orleans, the following-named officers were elected to serve for the ensuing year: President, Dr. J. C. Crimen; Vice-President, Dr. E. L. Fortier; Secretary-Treasurer, Dr. St. Clair Duke. Executive Committee: Drs. L. D. Archinard, H. P. Magruder, and Paul De Verges.

Suitable resolutions were passed on the death of John J. Archinard, A.M., M.D., honorary member of this Society.

ST. CLAIR DUKE, Secretary.

New Orleans, La.

Odontographic Society of West Philadelphia.

On January 3rd the Odontographic Society of West Philadelphia held their first annual meeting. The following officers were elected: Dr. L. M. Weaver, President; Dr. B. C. Hannington, First Vice-President; Dr. W. D. McKissick, Second Vice-President; Dr. J. A. McClain, Treasurer; Dr. R. R. Parks, Secretary; Dr. J. G. Lane, Editor.

R. R. PARKS, Secretary.